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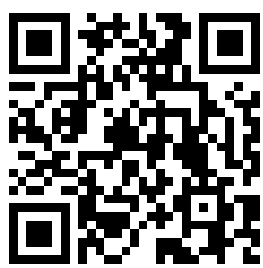

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INDEX TO TELEGRAPH AND TELEPHONE AGE

JANUARY 1 TO DECEMBER 16, 1924

A

American Telephone and Telegraph Company 359, 495
American District Telegraph Company's Annual Report..... 201
Automatic Telegraph Company Receiver Asked 86
American Engineering Standards Committee 394
American Railway Association Standards 460
An Old Telegram..... 254
Air Mail Beating the Telegraph. 227
An Injunction Asked for..... 154
Associated Press Sets New Moving Record 131
Associated Press Wireman's Club Gathers 205
Abbreviation Requirements..... 252
A Question of Authority..... 266
A Dollar's Worth for the Tax Dollar 407
A Few Hints Regarding the Adjustment of Telegraph Apparatus 420, 441
A Lost Opportunity..... 227
A Different World..... 231

Authors

Alter, J. M.—Operators on the Pennsylvania Railroad in 1867.. 196
Atterbury, W. W.—To Be President of Pennsylvania Railroad. 523
Batsel, M. C.—The Regenerative Receiver 391
Bates, D. H.—Low Rates a Stimulus to Business.....9, 81, 376
Bucher, E. E.—Approaching the Ultimate in Radio with the Super-Heterodyne Receiver..... 124
Burroughs, Chas. Edward.—The First Duplex 169
Brookman, S. J.—Clarence H. Mackay Champion at 50..... 166
Barrett, R. T.—Longest Through Telephone Circuit in World Links Chicago with Los Angeles and the Great Southwest... 201
Bryant, Roger H.—Courtesy of the Air 308
Berthold, V. M.—Telephone and Telegraph in Chile..... 311
Clark, C. M.—Military Telegraph in Arizona 320, 366
Crane, Dr. Frank.—Dependability 14
Cohen, Walter A.—Wavelength Versus Kilocycles 10
Crellin, E. A.—Some Experiences with a 202-Mile Carrier Current Telephone Hand 26
Corning, C. P.—District Commercial Manager's Work Outlined 57
Conrad, Frank—Hints on Antenna Construction 108
Chubb, L. W.—Interference from Radio Receivers 127
Casper, Louis—Student's Course in Technical Telegraphy.12, 35, 86
Candler, W. H.—Mind Training for Health and Success....508, 542
DeForest, Lee—A Quarter Century of Radio..... 467
Dickson, W. Lee—Fifty Miles from Nowhere....490, 517, 534, 558
Enright, Hon. Richard E.—He Linked the Lines Together.... 298
Easson, R. F.—Writing the History by the Telegraph..... 340
Ellsworth, J. D.—By the Horseback Route 55
Fuller-Leonard—Recent Developments in Carrier-Current Communication 6
Felix, E. H.—Using Wire Telephone Lines for Picking Up Radio Programs 180
Fuller-Vernal E.—Amateurs Are Real Heroes in Blizzard..... 179
Ellis, Robert—The Fastidious Mr. Johnson 273, 365
Hogshead, E. H.—Civil War Reminiscences 327
Harris, Archibald — Digest of Changes Between the 1921 and 1924 Tax Laws....292, 324, 356, 370
Howe, P. J.—Prolonging the Life of Our Pole Line Timber..412, 439
Howell, J. Frank....—..488, 493, 513
Harbord, General James G.—What Radio Broadcasting Offers the Farmer..... 29
Harbord, General J. G.—Pictures Future of Radio..... 549
Henry, Joseph—In the Hall of Fame 280
Jewett, Frank B.—Important New Cable Development 83
Jones, W. H.—How New and Old Telegraph Apparatus and Parts Are Kept Track of..... 463
Jones, W. H.—Why Some Succeed and Others Fail..... 505
Kintner, S. M.—Re-Radiation Interference with Radio Reception 348
Koch, Felix J.—Speaking of Wiring for Flowers..... 33
Little, D. G.—Radio Filter Condensers 372
Lemon, Lee — An Outstanding Achievement 14
Ledwith, R. W.—Improvident Operators 118
——Assassination of Garfield.... 130
——Coal Oil Johnny and Oil... 158
——Pen Picture or Two..... 82
Lawton, Geo. E.—Plymouth, Ill. Man Unearths Ancient Pewter Full of Coins Dating to 1856.. 540
——John R. Michales on Pension 207
Merrill, John L.—Dinner in Honor 116
Meyer, F. W.—Radio Broadcasting and the Broadcaster..... 175
Marshall, Joseph—Old Time Reminiscences 216
McIntyre, J. A.—Dedicated to the Memory of the Old Time Telegraphers of the Past and Future 520
McKosh,— Josh.—A Little Story of What Was and What Am.. 199
McCann, C. B.—Improvident Op- Is Healthy 578
MacKenzie, C. W.—A California Trip 131
McCullough, F. S.—Reminiscences of Vacuum Tube Research.... 60
Mackay, C. H. — Communication from Its Earliest Inception to Date 562
McNicol, Donald — Engineering Literature 100
Niesse, J. L.—Graphical Pole Line Calculations 566
Nyman, A.—Loudspeakers..... 61
O'Brien, John B.—Delicate Adjustments in Long Distance Circuits Make Possible Simultaneous Radio Broadcasting..... 581
Pierson, Chas. O.—Honored by Commission 541
Phelan, J. P.—Printer Telegraph Service 62
Parks, D. M.—Western Union Telegraph Company Mesenger Force, St. Paul, Minn..... 59
Pannill, Chas. J.—Ship Radio vs. Broadcasting 87
Phillippi, A. K.—Types of Radio Receivers 80
Popcke, A. G.—Behind the Scenes During Radio Broadcasting.... 109
Penne, Felix—Western Telegraphy School and the Man Who Runs It 173
Philippi, A. K.—Operation of Regenerative Receivers 277
Pearson, Drew—Western Union Head Says Radio Cannot Ever Replace Wires 553
Rhodes, Fred. L.—Poles..... 2
Rodgers, W. W.—Making Europe Part of United States Radio Audience 85
Robeson, D. S.—Glass as an Insulating Material 82
Robinson, S. L.—Sholes Typewriter 129
Rogers, Worth — Caustic Soda Primary Cells in Railroad Telephone Service 268
Reilly, Alan C.—Honoring the Inventor of the Typewriter..... 318
Shute, E. R.—Possibilities of the Radio as Opposed to Cables... 182
Sherris, Dot—Eight Years Old, Hailed as World's Youngest Telegrapher 194
Squier, Major General George O. —Application of Radio Engineering Principles to Submarine Telegraph Cables.244, 284, 301, 316, 347
Sarnoff, David — Why Super Broadcasting Means Better Service 487, 537
——Freedom of the Air—Uncensored and Uncontrolled..... 364
——Future of Wireless..... 148
——Broadcasting 202
——Back from Europe, Backs Long Waves for High Power Radio 419

Digitized by Google

INDEX

Thayer, H. B.—Situation of the American Telephone and Telegraph Company 178
Thayer, H. B.—Address..... 538
Taylor, John B.—Effects of Aurora Borealis on Communication Circuits and Means of Mitigation 427, 436
Ulrey, Dayton — Some of the Properties and the Purpose of the Filament in Your Vacuum Tube 322
Williams, W. R.—Telegraph in California in the '60's..... 9
Wright, J. E. — Convention of 1868 310
Wix—Tartartic Acid Crystals... 494

B

By the Sweat of His Brow..... 132
Bain, George, Cable Electrician Retires 469
Back to Nature Via the Automobile 399
Bronze Tablet to George Gray Ward 323

C

Colley, Ben W..... 135
Candler System Course...74, 286, 343
Coming Conventions 259
Care and Handling of Quadruplex Apparatus 373
Change the Name of Radio Central 541
Capacity 484
Communication from Point to Point at Railroad Terminals... 506
Click Click of His Telegraph Key Brings Seemingly Dying Man to Life 442
Cassatt, Miss Mary, Losing Her Sight, Gives Up Painting..... 447
Committee on Prominent Engineers 523

Cable

All America Cables..37, 91, 140, 158, 212, 260, 307, 383, 408, 433, 457, 475
Alaskan Cable Ship to Start First 955 Miles 253
Commercial Cable Co...44, 71, 96, 119, 142, 167, 190, 263, 311, 333
Commercial Pacific Cable Company 167, 190, 287
Cheaper Cables to Antipodes.... 471
Concession Terms for Buenos Aires-Montevideo Cable..... 423
Destroyers to Sound for Cable to Alaska 200
Direct West India Cable..... 502
Government Competitive Cables.. 398
Improved Cable Service to New Zealand 170
Italian Cable 418
Interesting Underground Cable.. 49
New Cable 421
New British Guiana-Barbados Cable 434
New Anglo-Dutch Telephone Cable 469
New Cable Will Mean Rate Cut 464
Pacific Cable Record..... 164
Possible West Indies Cable Sale. 132
Rum-Runners Suspected of Cutting American Cable..... 216
South American Cables..... 119
Transatlantic Cable Pioneers.... 73
West Indies New British Cable.. 129

Canada

Canadian National Telegraphs.46, 67, 91, 133, 174, 206, 235, 259, 307, 383
Canadian Pacific Railway Company's Telegraphs 326
Canadian Pacific Railway Company's Telegraph Messenger Boys, Montreal 206

D

Dark Past Justifies a Bright Future 10
Dinner of the Static Club..... 96
Dewey New Head of Federal Telegraph 345
Declaration of Dividends..... 481

E

Electrical Aid Society of Philadelphia 43, 130
Edi-Swan Base Adapter..... 17
Electrification of English Railroads 146
Electrical Developments in Egypt 337
EMF Electrical Year Book..... 217
Elliott, Head of Harvard Overseers 463
Ewing, Colonel Robert..... 480

Editorial

Arlington Signals Set Clock Automatically 328
Alaska Weather 208
Ask Telegraph Firm Receiver... 160
Bulls on Phillips' Code..... 256
Busiest Year for Western Electric 424
Breaks World's Speed Record... 208
Commercial Wireless Business... 424
Chicago and London Linked by Cable 64
Convention to Open Under 13,500 Flags 304
Communication Engineering 38
Direct Cable Service with the French Public 88
Device Aids Telegraphy..... 160
Employees Build Many Homes.. 184
England Will Never Be Conquered by Babbitt..... 400
Edison's Birthplace Gets Electric Lights 88
International Telephone Trust... 88
Intelligence in the Delivery Department 38
King George and Argentine President 112
Marconi Appeal Dismissed..... 208
Mackay, Clarence H., on the Future 256
Newspaper Equipped with Wireless 376
Ownership Statement 184
Passing of George Clapperton... 64
Seeing by Wireless..... 112
Telephone Lines of International to Girdle Globe..... 64
Telephones in Lithuania..... 400
Telegraph Service and Education 232
Telegraphers for Signal Corps... 112
Telegraph Auxiliaries..... 280
Telegraph and Telephone Age and Its Readers..... 14
Use of Telegraph Doubles in Year 88
Western Electric Company..... 112
West Indies 160
Why Telegrams Never Arrive... 160
Year 1922..... 30

F

Field, Cyrus..... 393
Few Civil War Telegraphers Left to Tell of Old Times..... 350
First Typewriter in Peoria..... 199
Facts About the Telephone..349, 462, 539, 582
Federal Telegraph Company..... 212
Facts About Electricity Worth Knowing.....177, 204, 230, 364, 417

G

Great Northern Telegraph..... 286
Grandsons of the Telegraph..... 11
Gerhard, A. E..... 266
Good Morse Operators..... 50
Greenwich Time 156
Globe Telegraph and Trust Company 323
Gulstad Relay 417
Gave College Its $2,000,000 Building 485

H

Haskins Galvanometer..... 111
How to Get a Raise..... 188
Hustled Wedding 189
Honoring Professor Morse..... 183
Honor Inventor of Typewriter.. 313
Historian of the United States Military Telegraph Corps Visits Gettysburg Battlefield..... 352
How to Balance the Quadruplex. 346

I

Institute of Radio Engineers.183, 418, 541
Incandescent Lamp Forty-five Years Old..... 446
International Communications... 31

J

Japanese Protest Radio Franchise of United States Company.... 337

K

Kolster Radio Compass..... 391
Kleinschmidt Printers Again Demonstrated at Convention..... 471
Kellogg Press..... 504
KDKA, World's Pioneer Broadcaster, Four Years Old on November 2nd..... 531

L

Long Service..... 41

M

Marconi Wireless Telegraph Company Stock..... 565
Magnetic Club Spring Dinner, 167, 238
Marconi Contract with the Post Office 397

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INDEX

Magnetism and Electricity..... 222
Morse Birthday Observed..... 242
Message Girdles the Earth in Eighty Seconds..... 206
Morse Memorial Dinner..... 220
Mackay Companies Report..... 110
Maize, Frank E., Appointed Electrical Chief..... 111
Marconi Beam System..... 337
Mastering Phillips' Code..... 121
Marconi Profits 58
Minneapolis Western Union Telegraph Company Messenger's Vocational Training Typewriting Class and Concert Orchestra 94
Morkrum Teletype..... 42
Military Telegrapher in the Civil War 47
Mutual Investment Credit Union 63
Many States Benefit by Zoning Legislation 408
Messenger Boys Have Many Duties 555

N

New York Telegraphers' Aid Society.....194, 458, 499, 529, 565
New Westinghouse Short-Wave Experimental Station..... 368
New York Has 40,000 Telephone Operators 251
New and More Simplified Method of Touch Typewriting..... 54
Noiseless Merges with Remington 86
New Stock Issue Authorized by Westinghouse Electric and Manufacturing Co. 150
New "Q" Telegraph Office, New York Central Lines, New York 246
Nevada, Where One in Every 150 is in State University..... 289
New York Telephone Company Report of Directors..... 295
New Era in World Intercourse.. 349

O

Old Time Telegraphers' and Historical Association. 199, 241, 255, 336, 524
Old Times at "187" Broadway.. 34
Origin of "30" and "OK"..... 198
Origin of "S O S"..... 326
Ownership Statement..... 472
Old Time Telegraphers..... 461

Obituary

Ahearn, Jos. F..... 383
Brown, Maybin..... 235
Byllesby, H. M..... 262
Brown, D. F..... 432
Bader, L. C..... 476
Boucher, Dr. J. B..... 550
Baker, M. A..... 552
Clapperton, Geo..... 47
Cottrell, C. H. H..... 93
Chapman, E. J..... 279
Clinton, C. V..... 433
Chapman, J. H..... 476
Drew, P. W..... 164
Delany, P. B..... 492
Doherty, Captain T..... 527
Foster, G. W..... 475
Grandy, D. B..... 279
Grauer, Adolph 527
Glass, Louis..... 550
Goff, J. W..... 550
Good, W. G..... 550
Hoover, Major R. H..... 260
Hill, G. R..... 476
Kaufman, A. C..... 143
Kennan, George..... 260
Kates, Jos. W..... 362
Keeley, D. H..... 476
Kane, J. W..... 550
Lamme, B. G..... 327
McKim, Chas. E..... 193
Martin, T. C..... 262
Malone, L. J..... 361
McCune, Mrs. E. C..... 433
Montgomery, Chas..... 580
Mason, F. C..... 580
Nourse, Frances A..... 550
Norris, J. B..... 23
Nichols, J. H..... 68
Phillips, J. S. W..... 47
Packard, Wm. Doud..... 47
Phillips, F. A..... 527
Rowe, R. D. E..... 120
Sawyer, W. A..... 479
Stevens, H. J..... 527
Snydor, C. T..... 23
Smith, J. W..... 93
Soper, W. Y.....262, 279
Stephens, James McConnell..... 288
Sheridan, F. J..... 580
Taylor, Theo. F..... 361
Uhler, W. M..... 433
Wheeler, T. P..... 22
Weir, A. S..... 47
Wooten, J. M..... 68
Whitney, Dr. W..... 119
Wilgus, A. E..... 143
Wiley, Geo. L..... 212
Winthrup, John..... 333
Wolf, Harvey..... 383
Waters, H. S..... 406
Woods, R. V..... 556
Young, Harry 333

P

Postal Telegraph-Cable Company, 19, 44, 71, 96, 119, 142, 166, 190, 214, 238, 263, 287, 311, 333, 360, 382, 406, 431, 457, 478, 500, 527 552, 578
Primary and Secondary Cells.... 302
Pennsylvania Railroad Operators. 249
Patents on the Vibroplex..... 231
Post Offices Four and a Half Millions Profit..... 189
Prominent Engineers on Radio Committee 164
Pinot Morse Printer..... 145
Phototelegraphy 93

Personal

Allen, A. W..... 96
Bruch, C. P..... 382
Chandler, A. E..... 166
Camp, W. J..... 238
Clowry, R. C..... 52
Daniel, C. M..... 70
Faulkner, P. J..... 406
Green, Dr. James O..... 142
Goulding, T. W..... 333
Hefler, W. H..... 478
Mackenzie, Major Cecil W..... 580
Needham, J. T.....382, 431
Pope, Mr. and Mrs. E..... 238
Porteous, Wm. A..... 382
Raven Hart, R..... 190
Stone, E. W..... 311
Wishart, Ronald S..... 214
Wilson, H. C..... 287
Weagant, R. A..... 527

Q

Quadruplex Faults and Disturbances 392

R

Radio Corporation of America, 22, 37, 73, 93, 119,139, 189, 212, 240, 260, 279, 355, 381, 404 433 475,, 502, 532, 579
Radio Corporation of America Annual Report 157
Radio Corporation of America Athletic Club 135
Romance and History of the Electric Telegraph 76, 104
Romantic Marriage Between the Children of Well Known Electrical Men 545
Restoration of Penn Post Jeopardized by Loss of Telegrams... 200
Recalls Burns Fete Held 65 Years Ago 375
Raven Hart to Morse..... 62
Railway and Commercial Telegraph Institute 394

Radio

An Open Road in Radio..... 514
Awards for Radio Invention..... 520
American Orchestral Concerts to be Broadcast by WJZ..... 33
Broadcasting to America—is our Power Sufficient 250
Broadcasting System for Chile Proposed 297
Broadcasting and the Entertainment Industry 217
Broadcasting from the Zoo..... 515
Breaks World's Radio Speed Record 158
Broadcast Receiving Sets on Board Ship 495
Crippled Wireless Stations to Reopen 144
Chile German Radio Station..... 119
Do Wireless Waves Bend?..... 270
Deaf Woman Hears Orchestra by Radio for First Time in Forty-Five Years 11
Distortionless Amplifier 32
Empire Wireless 227
Eighteen Radio Studios Linked on Defense Day 520
Extension of Standard Radio Frequency Transmissions 486
Electric Show in Melbourne..... 23
Electric Light and Power Wire Hazards 31
Fifty Million Audience is Radio's Latest Feat 155
First Permanent Broadcasting Station 553
First Radio Wedding..... 328
First Radio World's Fair Attracting the Attention of International Financiers 395
Finds Radio Wave Slower than Light 252
Father of Wireless 530
First Radio Circus Broadcasted.. 218
First Radio World's Fair Breaks All American Trade Show Records 480
First Radio World's Fair....327, 444
General Harbord Announces New South American Radio Plans 351

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INDEX

Germans to Put Wireless Phones on Trains 466
Greenland Radio Station..... 118
Growth of Wireless..... 184
High Powered Station..... 347
Hudson Bay Company Installs Radio Sets in Outposts..... 409
High Speed Radio Station in India 23
Imperial Wireless Scheme..... 397
International Radio Telegraph Convention 23
International Radio Regulations.. 98
King's Wireless 189
Kolster Radio Compass..... 444
KDKA's Signals Have World Wide Range 390
Listening-in On An Express Train in England 140
Mary and Doug Capitulate Broadcasting 122
Monopoly in Radio..... 82
New Invention to Improve Broadcasted Concerts 336
Navigation by Wireless..... 255
New Radio Stations..... 130
New Wireless Wonder..... 462
National Radio Conference..... 481
Origin of Broadcasting by Radio Telephony 516
Predicts Radio Aid to Sea Cable Work 236
Placing Radio on the Map of the World 515
Power from the Tides..... 179
Point to Point Wireless..... 177
Recent Radio Tournament..... 242
Radio Broadcasting to Start in Peru 337
"Radiocasting" not "Broadcasting" the Proper Word Now.. 328
Radio Conference 442
Radio on the Pennsylvania Railroad System 293
Radio Repeating and the Future of Broadcasting 228
Radio Interest is World Wide.. 443
Radio Signals Strengthened by Cold Waves 462
Radio Service Between Syria and Yugoslavia 423
Radio at Sea..... 423
Radio Broadcasting Station..... 163
Radio Sets for the Blind..... 529
Radio Antennas Not Lightning Menace 529
Radio Broadcasts Talks 7000 Miles Without Wire's Aid..... 156
Radio in Hospitals..... 496
Radio Printing 150
Radio Extends Help to Railroads and News Associations..... 84
Radio Election Returns Received in Speeding Trains..... 546
Radio Music Fund Committee... 121
Swedish Railways Changing Motive Power 386
Secretary Hoover Calls Third National Radio Conference..... 408
Senator Marconi and the Wireless Beam 369
Self-Governing Radio 496
Station WJZ of Radio Broadcast Central Reopens 10
Transmits 1000 Words a Minute. 278
Too Much S O S..... 170
Teaching French by Wireless..... 74
Train Control by Radio..... 91
University Faculty and Broadcaster Unite in First "Air College" 466
Unemployed Wireless Operators.. 115
Wireless War on Crime..... 278
Wireless Waves by Night..... 446
Wire Men Scorn Arbitration Award..... 447
Wire Woman for Fifty Years... 242
Wireless on the Train..... 160
Wireless Reception on Trains.... 159
Wireless Voice ..... 486..
Wireless Communication in Mines 151
Wireless for Lonely Operators.. 96
Waldorf-Astoria Sunday Concerts from WJZ..... 28

Railroad

Railroad..17, 41, 95, 115, 139, 163, 187, 211, 235, 259, 283, 331, 379, 403, 451, 475, 523
Telegraph and Telephone Section of the American Railway Association..17, 41, 91, 115, 139, 163, 187, 211, 235, 259, 283, 331, 355, 379, 403, 451, 475, 523, 573

S

School for Lineman's Training.. 556
Shorter Atlantic Voyage..... 461
Sholes Memorial at Illion, N. Y. 52
Surprise Party and Greatly Surprised Husbands 93
Statement of Godfrey Isaacs.... 134
Slow Telegraph Service in England 74
Squier's New Wire Code is 2.56 Times as Speedy as Morse.... 276
Strike of Marconi Operators in London 193
Short Cut to the Highest Degree of Shorthand and Typewriting Efficiency 154
Storage Battery and Its Application to Telegraphy..... 465
Say Operator's Mistake Cost Ford South Dakota 37
Still Holds Her Secret..... 48

T

Test All Long Distance Lines Every Morning..... 582
To Telegraph Employees..... 43
Teletype on the Great Western Railroad of England..... 183
Tibet Accessible by Telegraph... 199
Towards the Electrical Age..... 388
Two Old Telegrams..... 367
Telegraph and Telephone Life Insurance Association...129, 146, 167, 197, 241, 278, 304, 384, 419, 463, 495, 532, 577
Telephone Pioneers of America Printed Proceedings...128, 242, 365
Telegraph Statistics..... 407
To All Cable Users..... 447
Telegraph Exchange Installation Beats Post Office Establishment 345
Three Thousand Telegrams Sent Out in Connection with Annual Sale Brings Big Results..... 229
Telegraphers Strike in France... 262
Transportation and Public Utilities as Fields for Business Careers 53
Telegraph Jubilee 68
Telegraph and Telephone Materials for China..... 96
Try the Operator's Way of Saying Them..... 530
Telephone Operators Write Language of Their Own in Keeping Record of Long Distance Calls 503
The Telegraph and the Typewriter 154

Telephone

Automatic Telephone Control for Switzerland 337
Built First San Diego Telephone Lines 111
Chronology of the Telephone Business 255
Creosote Bath Lengthens Life of Telephone Poles..... 68
First Telephones in Canada..... 92
Independent Telephone in England 23
Milwaukee's Telephones..... 423
New Telephone System Project in Gibraltar 423
Novel Telephone Uses..... 349
Progress of the Telephone and Telegraph Systems..... 399
Spanish Telephone System to be "Americanized" 337
Telephone Apparatus Production in Sweden..... 319
Telephone Development in Argentine Republic..... 365
Telephone Company Scores in South Carolina Rate Case..... 514
Telephoning to Liners..... 146
Telephoning Telegrams to Nearby Town Most Efficient Method.. 251
Telephone Notes..... 5
Wireless Telephony..... 276
Were Afraid to Use Pioneer Telephones 565
What "Station" Means in Telephone Parlance..... 582

U

United States Military Telegraph Corps 226
Utah Boys and Girls Who Talked by Lightning a Generation Ago. 145

V

Vibroplex Victory..... 22

W

Western Union Telegraph Company..21, 45, 71. 97,120, 143, 168, 191, 215, 241, 263, 288, 312, 334, 360, 382, 407, 432, 457, 479, 502, 528, 553, 579
Wireless Education..... 570
Western Union Dinner and Dance, London 60
Western Union Telegraph Company Prize Competition..... 271
Western Union Telegraph Company, Annual Report..... 172
Western Electric Company' Report 152
Western Electric Out to Enlarge Facilities 122
What Did Mr. Edison "Sine"... 504
Wheatstone Bridge..... 396
Wedding Ceremony Fails to Keep Announcer Silent for Even an Hour 193
What Hath God Wrought..... 269
Wireless Telegraph Versus Submarine Cables 236
West India and Panama Telegraph Company..... 564

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CONTENTS.

PAGE

Poles. By Frederick L. Rhodes..... 2
Telephone Notes..... 5
Recent Developments in Carrier-Current Communication. By Leonard F. Fuller..... 6
Low Rates a Stimulus to Business. By David Homer Bates. F. E. d'Humy, Author of an Inspiring Book..... 8
The Telegraph in California in the '60's..... 9
Wavelength Versus Kilocycles. By Walter A. Cohen. A Dark Past Justifies a Bright Future. Station WJZ of Radio Broadcast Central Reopens.... 10
Deaf Woman Hears Orchestra by Radio for First Time in Forty-five Years. Grandsons of the Telegraph. Facts About the Telephone..... 11
Student's Course in Technical Telegraphy. Lesson 86..... 12
Editorial—Telegraph and Telephone Age and Its Readers. An Outstanding Telegraphic Achievement. Dependability. By Dr. Frank Crane..... 14
Railroad—Telegraph and Telephone Section of the American Railway Association. A. V. Kipp. Edi-Swan Base Adapter..... 17
Postal Telegraph-Cable Company. Fall Dinner of the Magnetic Club..... 19
Commercial Cable Company. Commercial Pacific Cable Company. Technicalities. Western Union Telegraph Company..... 21
Radio Corporation of America. Another Victory for the Vibroplex. Obituary. 22
Electric Show in Melbourne. International Radio Telegraph Convention. Independent Telephone in England. High Speed Radio Station in India.. 23

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POLES

Requirements for Poles in Communication Lines

By Frederick L. Rhodes

Next to the telephone instrument itself, the element of telephone plant which is most familiar to the public is the pole. In attempting to visualize the enormous number of poles required by the Bell System, it may be helpful to consider that the nearly 15,000,000 poles now in use would furnish sufficient material for a railroad trestle, thirty feet high, reaching from Chicago to Buenos Aires. Additions and replacements call for three-quarters of a million new poles each year, or enough to build a telephone line two-thirds of the distance around the earth. These comparisons may also serve to indicate the magnitude and the consequent importance of the pole problem in the Bell System.

Much work has been done by Bell System Engineers to enable pole lines to be designed so as to meet service conditions most economically. This has included investigations of the stresses in the poles and other portions of the line under such wind and ice loads as may reasonably be expected to occur in the locality where the line is constructed, experiments to determine the strengths of many different kinds of timber and researches into the effects of various preservatives in increasing the durability of poles.

The most economical poles for use in any particular section of the country are those poles which will withstand the required load at the minimum annual cost.

The load carried by a pole depends upon the weight of the wires or cables which it sustains and the pressure of the wind upon them. The most severe loads occur when the wires or cables are heavily coated with ice and a strong wind is blowing in a direction at right angles to the line.

Factors which affect the load, in addition to the number and size of wires and cables, are the lengths of spans between poles, the climatic conditions (wind and ice) to which the line is exposed, and the degree of shelter of the line, as by hills, forests or buildings.

The annual cost, which includes return on investment, taxes, reserve for replacement and maintenance, depends chiefly on first cost and length of life.

Into the first cost of the pole, in place, enter such items as the price at the woods, the freight rate (depending on the weight of the pole and the distance of the place where it is to be used from the point of supply), and the cost of hauling and erecting.

The length of life depends upon a variety of factors, the most important of which (apart from questions of inadequacy and obsolence) are the character of the timber, whether or not a preservative treatment is employed and, if so, the nature of the treatment, the local climatic conditions and the original size of the pole.

The importance of the latter factor, the original size of the pole, is due to the fact that those who are responsible for the plant and the service have to decide, for every type of construction, taking into account all the conditions of location, exposure and use, how little sound wood may remain at the ground line section of the pole before it should be replaced on account of decay. If the original size of the pole is only slightly more than this critical size at which replacement should be made, the life of the pole will be very short as decay will reduce the size at the ground line to the critical size within a few years.

On the other hand, whereas a pole of huge size at the ground line would have a very long life before decaying sufficiently to require replacement, the cost of so stout a pole might readily be so great that its annual cost would exceed that of a smaller and cheaper pole.

Principal Kinds of Pole Timber

The principal kinds of wood used for poles are eastern cedar, western cedar, chestnut, and yellow pine. The eastern cedar now used for poles comes mainly from Minnesota. There are also extensive tracts in Canada, and some in northern Maine. In years past enormous quantities have been cut in both the northern and southern peninsulas of Michigan, and in northern Wisconsin. Locations in swamps and along streams afford favorable conditions for the growth of this timber. Under normal conditions cedar poles require from one hundred to two hundred years to grow. Western cedar grows on both the eastern and western slopes of the Cascade Mountains and on the western slope of the Rocky Mountains in the extreme northwest section of the United States and adjoining parts of Canada. Chestnut is found principally along the Atlantic Coast and in the Appalachian Mountain regions. North of Virginia, chestnut has within recent years been practically exterminated by the chestnut blight. While the blight-killed trees have been available for poles, this region, after being cut over, will, in general, cease to be a source of future supply, at least for many years. To what extent the blight will enter the region south of Virginia, where are found the principal stands of chestnut timber, cannot be answered at the present time. Chestnut grows more rapidly than cedar, an average chestnut pole requiring from forty to sixty years to grow. Yellow pine grows principally in the south Atlantic and gulf states. Pine grows quickly, on the average taking somewhat less than chestnut to produce poles.

Strength and Weight

Chestnut, yellow pine, and western cedar are about equal in strength. Eastern cedar has about 70 per cent. of the strength of these timbers. The values as to timber strength which form the basis for pole line design in the Bell System have been derived by our engineers from experiments on poles which have been tested by breaking them under measured loads.

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The figures are considerably smaller than those frequently found in the text books on strengths of materials. The difference is due to the defects found in the actual poles, whereas the small specimens subjected to the ordinary laboratory tests are so selected as to be clear and straight-grained. Tests recently conducted on some old cedar poles that had been many years in service show that there is but little, if any, tendency for the fibre strength to deteriorate when the wood remains sound.

There is considerable difference in the weights of the different pole timbers. This has a direct bearing on the costs of transporation and distribution and, to some extent, affects the cost of erecting. Chestnut and creosoted yellow pine poles weigh almost twice as much as cedar poles of the same size. In the case of yellow pine the treating process adds about a third to the weight of the untreated pole. The degree of seasoning has a considerable effect on the weights of poles. Chestnut poles are ordinarily shipped in a fairly green condition, whereas cedar poles are frequently held at a concentration point for a sufficient time to season partially, at least. Except in the case of unusually tall poles, the weakest section is at or close to the ground line. For poles of a given length and kind of timber, the breaking strength varies theoretically with the cube of the diameter at the weakest section. This relation serves to show why it is that thick poles are so much stronger than slim poles. For example, a pole 12 inches in diameter at the ground line is 70 per cent. stronger than one 10 inches in diameter, and a 15-inch pole is 240 per cent. stronger than a 10-inch pole. This relation also explains why it is that a limited amount of "hollow heart" has only a trifling effect on the strength of a pole.

Only those kinds of timber which are most durable after the trees are cut are suitable for poles. Hardness and density of the wood seem to have no effect on its durability. The durability of short-lived timber can, however, be increased greatly by suitable preservative treatment. This is necessary in the case of yellow pine, and is advantageous in many cases with other kinds of timber. The action of the preservative in retarding decay can perhaps be more readily understood after a brief explanation of the nature of decay in timber.

Nature of Decay

Wood is composed of a multitude of minute elongated cells which lie closely side by side to form the wood structure. The surfaces of these cells are in contact with each other and are held together firmly by a cement-like tissue. When timber is fractured there is a tearing away of these cemented surfaces. The decay of timber is caused by the activity of low forms of plant life, principally in the form of fungus threads, which feed upon and dissolve the walls of these wood cells. These organisms are so minute that a powerful microscope is required to see them, yet their work results in the destruction of billions of feet of timber every year. They can grow either in light or darkness, but all of them require certain amounts of air, moisture, heat, and food; the latter being the wood itself. If one or more of these things is lacking the organism cannot live and the decay of timber will not take place. Wood constantly submerged in water does not rot, because there is an insufficient supply of air. On the other hand, if wood can be kept dry it will not decay, because there will then be too little moisture.

The decay-producing fungi do not flourish in ordinary soils at a depth of more than about two feet, on account of the lack of air. The atmospheric moisture is sufficient to permit the development of the dry-rot fungus. Wood freshly cut contains enough water at all seasons of the year to enable the decay organisms to flourish. In the case of cedar and chestnut poles, the portion of the pole above ground does not ordinarily decay, except at a very slow rate. The butt end of the pole, deeply buried in the ground, although frequently permanently damp, does not get sufficient air for rapid decay to take place. It is near the ground line, where the earth holds the moisture and keeps the wood damp for long periods in the presence of air, that decay is most rapid. Preservatives act antiseptically to kill the fungus growths that produce decay. They are also effective to some extent in preventing the entrance of moisture by plugging the pores of the wood.

Preservatives

Various metallic salts, such as zinc chloride, copper sulphate, and corrosive sublimate, have been used in this country and in Europe for preserving timber for various uses, but experience has shown that dead oil of coal tar, usually termed coal tar creosote, or simply creosote, is more effective for pole preservation than these metallic salts. While the preservative action is probably due to the poisonous effects of water soluble constituents of the preservative, it is also important that the preservative as a whole should not be freely soluble in water as then it would be leached from the timber too quickly. It is also obvious that the use of materials poisonous to human beings and domestic animals is undesirable.

Bell System engineers early appreciated the advantages of creosote as a preservative and for fully twenty-five years they have been acquiring data as to the results obtained from its use. This has been done by placing large numbers of experimentally treated poles alternately with untreated poles in lines in various parts of the country and, at regular intervals, usually every three years, carefully measuring the extent of decay in both the treated and untreated poles. Examinations thus made of thousands of poles treated in various ways have enabled trustworthy and reliable results to be obtained from which to determine the added life resulting from the treatment.

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While our experiments have largely been directed toward discovering the best methods of using coal tar creosote, we have by no means neglected to test many other kinds of preservatives. In fact, our experiments have included every known preservative which has offered promise of success. At the present time numerous preservative materials and processes are undergoing preliminary trial in a special laboratory room maintained at a temperature and humidity favorable to decay, where test specimens of timber, to which the new materials and methods have been applied, are placed in close proximity to the decay-producing fungi. By this means results are obtained in a few years which are fairly comparable to those which would require considerably longer under actual service conditions.

Yellow pine, although a strong and otherwise satisfactory pole timber, decays rapidly, particularly in the South, if used without preservative. Moreover, the decay is not confined to the ground line, but speedily effects the entire pole in the absence of suitable treatment. Fortunately, the structural character of this timber is such that it can readily be treated. All yellow pine poles used in the Bell System are creosoted thoroughly their entire length. The usual method of applying this treatment requires a somewhat elaborate plant, the principal feature being the treating cylinder, of which there are several at each of the larger plants. The average modern treating cylinder ranges from 120 to 130 feet in length and from 6 to 7 feet in diameter. It is constructed like a steel boiler shell, with one or both ends hinged so that they can be opened. The timber to be treated is piled on small cars which run on rails that lead directly into the cylinder at one end. After the timber is moved into the cylinder the latter is tightly sealed and filled with steam. The timber is steamed for several hours, the length of time and the temperature being regulated by the specifications which our engineers have prepared in the light of all their experience with these matters. The steaming softens and opens the wood cells and liquifies and removes the resinous and sappy constituents of the timber. After the steaming is discontinued a vacuum is applied to the cylinder. This assists in evaporating the water left in the timber after the steaming process. When the vacuum has done its work, the pumping is stopped and the cylinder filled from a large tank containing hot creosote. After the cylinder is completely filled, pressure sufficient to force the specified amount of oil into the timber is applied. After the pressure is released the oil is pumped back into the tank and the difference in the initial and final readings of the gauge attached to the tank shows the amount of oil that has been absorbed by the timber.

In the case of cedar and chestnut the portion of the pole above the ground line has normally a very long life. It is the portion of the pole at or just below the ground line which decays most rapidly. For this reason much attention has been given to methods for applying preservatives to the butt end of the pole, extending up for about a foot above the ground line, and leaving the upper portion of the pole untreated. The simplest way of doing this is to apply the preservative like paint with a brush. In order that definite information might be obtained as to the value of these brush treatments, the American Telephone and Telegraph Company, in 1902, initiated a series of experiments jointly with the United States Forest Service. Several hundred poles were included in these tests. All the preservatives used were carefully analyzed. The experiments included brush treatments with several different kinds of carbolineum, dead oil of coal tar, and a number of kinds of wood creosote. Some of these poles were set in the coast region of Georgia, where the conditions are favorable to rapid decay, and some were set in western Pennsylvania and New York. The treated poles were set alternately with untreated poles, in order that comparisons might be made.

Another line of experimentation which has been carried out by this company in cooperation with the Forest Service has been the treatment of pole butts with creosote by the so-called "open tank" process. With this method the butts of the poles are placed in a tank and immersed in creosote to a point about one foot above the ground line. The creosote is then heated above the boiling point of water, generally by means of steam pipes within the tank. This converts the water in the wood cells into steam, most of which escapes by bubbling through the oil. The air in the wood cells is also expanded and partially expelled. After the pole has been thoroughly heated in this manner, the hot creosote is quickly replaced by cool creosote, or the poles are quickly transferred to another tank containing cold oil. In either case the effect is to form a partial vacuum in the wood cells, allowing the creosote to be forced into the timber by atmospheric pressure. These poles have been inspected regularly and a large amount of information obtained as to the extension of their life resulting from the treatment.

Improvements in treating have recently been made whereby, by perforating the sapwood of the pole for a short distance above and below the ground line, it is made easier for the creosote to enter the wood at this section of the pole, and more uniform depths of penetration are secured. The perforations are generally from a quarter to a half inch deep, and are closely spaced.

Untreated chestnut rots considerably faster than untreated cedar. For this reason, coupled with the expectation of future scarcity of chestnut, work is being actively pushed which is expected to lead to the installation of local treating plants, within the areas from which the supply of chestnut poles is now being drawn, so that the poles may be concentrated at these points and given an effective treatment, ex-

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tending from the butt to a point above the ground line when the pole is set. The first of these plants, with a capacity of 10,000 poles a year, is scheduled for completion by the end of this year.

Creosote contains various volatile and soluble constituents, which very gradually escape from treated timber during protracted exposure to the elements. Creosoted poles that have been in service from 10 to 25 years have been removed from the line and the creosote extracted from them and analyzed with great care. As the original composition of the creosote had been very carefully determined by analysis at the time when the poles were treated, it has been possible to discover what changes had taken place in it. Investigations of this kind are still going on. They are important in that they furnish data that enables our engineers to revise the specifications for the creosote in order to obtain the grade that is best suited to the work. They are showing that most of the constituents of the creosote tend slowly to escape from the treated timber, the action being more rapid in the portions of the poles which are above ground. The rate of escape, however, is so slow that the value of the treatment is well established.

Poles of Steel and Concrete

The question is sometimes asked why poles of steel or of reinforced concrete are not more generally used instead of wood poles. Our engineers in 1909, designed a series of concrete poles of which a large number were constructed. Some of these were tested and their actual breaking load was found to be close to the computed values. The remainder of these poles, about 500 in all, were placed in actual service in pole lines in various parts of the United States, in order that their behavior under the stresses due to wind and sleet loads, the vibration caused by the wires and cables, and the effects of frost, lightning, and other actions of the elements might be observed. The poles are being inspected every three years.

The most expensive element in a reinforced concrete pole is the steel reinforcement. Steel is vastly more expensive per cubic foot than either concrete or wood. In order to obtain reinforced concrete poles comparable in strength with the wooden poles generally used in the telephone plant, so much steel is required that poles of reinforced concrete or steel are much more expensive than wooden poles, even at the prices which obtain at the present time.

Looking into the Future

These concrete poles have not been made with the thought that they or any other concrete poles will generally supersede wooden poles within a short time. They have been placed in service so that experience with them will be obtained which will serve as a guide to our engineers in the future, should the time ever come when the relative costs of these poles in comparison with wood are such as to indicate that their use might be justifiable.

It is the aim of our engineers in the conduct of this, as well as all of our experimental work, to anticipate future conditions and such new requirements as may be brought about thereby, sufficiently in advance so that we shall be able to develop and have ready thoroughly tried-out materials and methods when these are required, to the end that the orderly expansion of the business will not be checked and the Associated Companies forced to install new and untried materials in their plants. This work is one portion of the Bell System policy of preparedness.—*Bell Telephone Quarterly.*

TELEPHONE NOTES

In 1881, a quarter of a mile was the limit of distance for talking through underground circuits. In 1913, it was possible to talk 455 miles, from Boston to Washington, through underground cable.

It is reported that the telephone in the first stages of its introduction often led to serious results. According to a pioneer man of Columbus, Ohio, a telephone operator in those days, women used to faint when they heard a voice at the other end of the wire, thinking it was an instrument of the devil.

In the new machine switching office of the Pennsylvania exchange, there are 7,000,000 soldered connections, all of which had to be made carefully by hand. The numbers of soldered connections in New York City, including all machine switching offices, would run into countless billions.

The telephone directories used in the Bell system have a total annual circulation of 25,000,000 copies, which makes them the most popular publications in the world. To print them requires more than 30,000 tons of paper.

Haiti, with an estimated population of 2,000,000, has only 747 telephones and about 1,500 miles of telephone wire.

With the new building acquired by the Western Electric Company at Hawthorne, Chicago, 1,250 more persons will be engaged in making telephone apparatus, and 160,000 feet of working space will be added to that extensive industrial center.

French experimenters, we hear from the London *Daily News,* have worked out, through an ingenious code of rules, a new wine testing device, with the aid of the telephone. An electric current linked up to a telephone is supposed to reveal the true characteristics of the wine under investigation, and whether there is an adulteration present.

The concrete buildings of the Nippon Electric Co., at Tokyo, associated with the Western Electric Co., were completely wrecked in the recent great earthquake, according to reports, and it is estimated that 100 were killed. Brick buildings, however, remained intact, and all but one of the Americans connected with the company are reported safe.

Production of telephone transmitters this year will exceed 1,500,000—an increase of almost 40% over the record output of a year ago.

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RECENT DEVELOPMENTS IN CARRIER-CURRENT COMMUNICATION

By Leonard F. Fuller

Carrier-current communication over transmission lines is being adopted rapidly not only as an auxiliary to existing wire telephones, but as the only means of direct communication for some recently constructed lines.

As our accumulated experience has increased the desirable frequencies and the range of sets of various powers over lines and networks of different types have become fairly well established.

Field experience to date has shown the practicability of transmitting carrier-current over power systems with reliability and certainty. The method has been proved basically sound.

Recent Developments

The next steps in development are improvements in the apparatus, both mechanical and electrical, including those features which give greater operating convenience and flexibility.

Remote control of the apparatus is an example. Early sets were designed for control distances up to 250 ft., which is sufficient for the usual conditions encountered when the operator and apparatus are in the same building, but remote control attachments now available increase this distance to several miles. Thus a dispatcher in a city office building can control the carrier-current set miles away in an outlying suburban substation.

A modification of the foregoing is to retain the control of the carrier set at the station at which it is installed, but to have it arranged so the operator at the station can plug in the voice control on any one of a number of the company's wire phone lines. Such an arrangement allows distant stations to communicate directly with anyone in the main office.

Calling is accomplished on existing carrier-current channels either by one or more gong bells operated by a local relay, or by means of a loud sepaker which permits direct voice or howler calling. This method is employed in the Great Western Power Company and Pacific Gas and Electric Company equipments, while the relay and call bell method has been generally employed in eastern installations.

Each method has its inherent advantages and disadvantages. The loud speaker cuts the time for short dispatching orders almost in half when operators are constantly within hearing distance. In such cases calling and answering calls are dispensed with. The dispatcher gives an order and the station to which it was directed repeats it. The Great Western Power Company has used this method for over a year and the Pacific Gas and Electric Company has also found it satisfactory.

If there are several carrier sets on a system, which intercommunicate frequently, it is often annoying and generally undesirable to have a loud speaker talking when its station is not concerned with the conversation. In one installation there was an objection to the loud speaker, not because of undesired conversation which did not exist in this case, but because of the line and electric storm noises which were reproduced. Relay and gong bell ringing is necessary in such cases.

Selective ringing is a further refinement which may be employed when code ringing of the gong bell would cause annoying and unnecessary disturbance at several stations of which only one was desired.

Time limit attachments are often furnished with the calling relay system to prevent electric storms and other high-frequency disturbances from ringing the gong bell. Code ringing is possible with such attachments, since the time limit feature is automatically inoperative after the first signal which must be a long dash. It may be followed by any desired dot and dash combination.

An excellent calling system is a relay with time limit attachments arranged to connect a loud speaker in circuit at the end of the long dash above mentioned. A gong bell may be added if desired. In this way the loud speaker does not reproduce undesired noises, but comes into service automatically for any speech or code calling.

A selector system may be added to such a combination. In this case the loud speaker is connected in circuit only when its station is called, but after being connected, the message may follow immediately if desired, with the resultant saving in time.

We are thus able to utilize the desirable features of the loud speaker system and remove those considered detrimental.

The calling relays are quite reliable when equipped with the time limit feature. They require very little energy and will operate with less than is required for satisfactory speech. Thus we can ring over any line over which we can talk.

All our installations are simplex. That is, the operator throws a tumbler switch or operates a foot pedal to connect the apparatus for talking or listening. This method has met with success wherever installed. It rarely takes an operator more than the first day to become used to the scheme of things.

The writer once saw a laborer working about a station called to the carrier phone set to receive a personal message from a man he had known in the army who happened to be visiting the station at the other end of the line. After operating the talk-listen button for him for the first few sentences no more assistance was required and the conversation proceeded vigorously.

This was a case where men who had not talked with each other for two years and who had never seen a carrier phone set before, found simplex operation so easy that they carried on an animated conversation over a 200-mile line for some time.

Duplex operation, except over short distances with sets of very low power, complicates the apparatus and decreases its reliability out of all proportion to

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the slight advantage gained. The users of this equipment are mainly station operators who soon grow accustomed to the man at the other end of the line and the semi-routine character of a large portion of the traffic handled.

Telegraphy is a valuable adjunct which may be added to carrier-current sets. It may be by either interrupted or continuous waves. The latter are preferable in emergency work because they will permit telegraphic communication under extremely severe line conditions.

The writer has received continuous wave telegraph signals at Pit River from the Vaca-Dixon substation 202 miles distant with all 6 line conductors grounded at several points although telephony and interrupted wave telegraphy were altogether out of the question, not a sound being heard in the phones.

For communicating over very noisy lines and during bad electrical storms interrupted waves may be used, but continuous wave heterodyne reception is probably preferable.

In starting telegraphy on an existing carrier-current telephone channel it is preferable to begin with a list of code signals for the common orders and use these frequently while the operating personnel are learning the telegraph code.

A speed of only 5 words per minute is of great value in emergencies when all other forms of communication may have failed. Most men can learn to send and receive at this speed without great difficulty. The higher speeds used in commercial telegraphy are learned easily and well only by rather young men.

Energy Transfer and Flow

Irrespective of the use to which the carrier-current energy is put at the receiving station, the method of transmitting it to and from the line is the same.

At the transmitting station a carrier-frequency current is fed into the line. This results in a potential difference either between all line conductors and earth or between conductors. To date commercial installations have utilized the former method.

The electrostatic field due to this potential difference expands or travels down the line toward the receiving station at a velocity depending upon line constants. Usually this is not far below that of light in free space.

If the carrier frequency is 30,000 cycles per second, a half cycle will last 1/60,000 second and the static field of one half-cycle will have extended for about 3 miles along the line before the reversal of polarity due to a succeeding half-cycle commences.

If our eyes could see electrostatic fields and we stood at any point along the line, while these things were occurring, we would see nearly three miles of field slide by at about the speed of light, with the line positive with respect to earth, followed by an equal length in which the polarities were reversed.

If the line is short enough to allow the static field to travel to the receiving station while it is still being formed at the transmitter, the load drawn by the receiver will effect the power output of the transmitter. That is, the input impedance of the line will be varied by the receiver or load impedance.

This phenomenon, which is always observed, at power frequencies on lines of present day length, is rarely observed at carrier frequencies. The lines are obviously too long to permit it.

Thus the energy delivered to the line at the sending stations becomes wholly detached from the transmitter and is either partly absorbed by the receiver or frittered away entirely in line losses.

The most common method of charging the line at the transmitter is to erect a "coupling wire" in the vicinity of the line conductors. When this is raised to a given carrier-frequency voltage with respect to earth the conductors assume a potential corresponding to their relative positions in the static field.

Various types of coupling condensers have also been employed with mica, porcelain, and other dielectrics. Such condensers are connected between the carrier-current transmitter and the line, the current passing through them charging the line with respect to earth.

At the receiving station various arrangements capable of extracting energy from the electrostatic field may be used. Coupling wires, large wire loops, coupling condensers and combinations of them may be employed. At the present time the coupling wire method is preferable for both transmitting and receiving, due not only to its reliability, simplicity and ease of inspection, but also to its low first cost.

Station Apparatus

The sending and receiving station apparatus is much like that used in commercial radio communication with such modifications as are desirable for power system use.

Power is supplied to the transmitting vacuum tubes of 50 watt sets at 1000 volts d. c. by a small motorgenerator.

More powerful sets of 250 to 500 watts carrier frequency power output are built for the longer lines. Communication by the 500-watt Pit River set of the Pacific Gas and Electric Company has been received over 410 miles of line.

These equipments are built in several units.

The 250-watt set comprises:

(1) A power panel on which the motor generator starter, switches, fuses and instruments are mounted.

(2) The transmitting apparatus, cabinet housing all necessary vacuum tubes, instruments, coils, relays, etc.

(3) The receiver cabinet.

(4) The motor generator.

(5) The operator's desk phone set and a loud speaker when used.

Both the 250 and 500-watt sets are of the master oscillator type, that is, the carrier-frequency currents are generated by a small tube used to excite a larger one. The output of this power amplifier is modulated in accordance with the voice by another

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or modulating tube and then delivered to the coupling wire.

This method gives a substantially constant carrier frequency irrespective of line conditions and maintains a better voice quality than is possible with self-exciting tubes when forced to operate under adverse conditions.

SUMMARY

In this paper I have attempted to outline briefly and without irrelevant technical or descriptive detail, the outstanding features of carrier-current work on transmission systems as we know it today.

Our present technique has the background of the older radio communication. Active commercial experience on high-voltage lines has been of shorter duration, but amply sufficient to prove the method technically and economically sound, and to demonstrate a few of the many uses the future will find for it.—*A. I. E. E. Journal.*

Low Rates a Stimulus to Business

BY DAVID HOMER BATES

WHILE in charge of the Baltimore & Ohio Telegraph Company in 1886 I reduced the rate for extra body words over ten as follows:

One cent on rates up to 35 cents and two cents over that figure. My view was that as each ten body word message contained at least thirty transmitted words, it was not logical to charge the public more pro rata for additional body words over ten. It should also be borne in mind that no matter how many body words are in a message, the cost of collection and delivery service is the same.

About the same time under Robert Garrett's direction, I established a Ten Cent rate between New York and Portland, Maine and intermediate points. Twenty-five cents to Chicago, St. Louis and other Western cities, and fifty cents to New Orleans, Galveston and other Southwestern cities. The response of the public to this reduction was prompt and satisfactory. Every office of the Company remitted a monthly balance to the treasurer at Baltimore.

I caused all Ten Cent messages at New York, Providence, Boston and Portland on a given day to be counted and found that they averaged seventeen body words so that we were receiving seventeen cents a message instead of ten cents.

I have always thought that this reduction and its favorable result hastened the purchase in 1887 by the Western Union Telegraph Company of the Baltimore and Ohio system at a large profit to the latter.

After Colonel R. C. Clowry became president of the Western Union Telegraph Company, I went to him with my Baltimore and Ohio experience with low rates and urged him to reduce his tariffs. He referred the matter to his Superintendent of Tariffs, William Holmes, whose long report in opposition to my suggestion was sent to me.

Later, after Theodore N. Vail became president of the Western Union Telegraph Company, I went to him with my Baltimore and Ohio figures and asked him to give the subject of a reduction in rates consideration. He referred the matter to his assistant, Edward W. Hall, who gave me an interview in which he argued with Wm. Holmes that my plan had no merit to it. I pursued the subject with Mr. Vail, however, who said he would study it more carefully.

Some time afterwards he announced his Fifty Word Day Letter and Night Letter Rate and Week End Letters, at a large reduction from the old figures. This has become very popular with the public and has served to utilize the otherwise idle wires at night.

I still think my Baltimore and Ohio low extra word rate should be adopted by both the leading companies. The current extra word rate discourages long messages. The public should instead be led to lengthen instead of shorten their messages.

F. E. d'Humy, Author of an Inspiring Book

IN most large commercial organizations there is today charged to materialism, ego, acquisitiveness, and other characterizations of this order, much of the discontent and indifferent performance so prevalent among the rank and file of those carrying on the details of the world's work.

Thinking men—both those engaged in executive capacities and those in closer touch with the offices and the shops—have sensed that the one untried line of betterment remaining is that which recognizes the possibilities of improvement in the state of mind of the individual.

It is not necessary to be a sage or a philosopher to know that much of the woe through which many people imagine they are drifting is, in reality, a state of mind.

Mr. d'Humy has written a book which aims at a correction of this blight, which so insidiously slows up individual progress and individual realization of life's most agreeable gifts.

The title of this new book is "Conscience and Success." Copies may be purchased from Telegraph and Telephone Age, 253 Broadway, New York, at $1.00 each.

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THE TELEGRAPH IN CALIFORNIA IN THE '60'S.

Superintendent W. R. Williams, of the Western Union Telegraph Company, Los Angeles, Unearths Interesting Facts Bearing on Introduction of Telegraph in California.

THE West of the '49s has long since passed into fame and story, likewise the infant days of the telegraph on the Pacific Coast but because of it any gleamings from the feeble start of the profession becomes all the more interesting.

The first telegraph line in Southern California was built from San Francisco down through the beautiful San Joaquin Valley by the Pacific and Atlantic Telegraph Company. The first message sang over the wire at the hour of eight on the evening of October 8, 1860, from the pen of the Los Angeles Mayor who greeted the San Francisco Executive. An hour afterward the entire city was celebrating the momentous occasion and the sole newspaper representative in Los Angeles was gleefully filing his first telegraphic press report detailing the gala festivity.

During the summer of 1860, when the telegraph line was only completed southward to a point near Visalia, Calif., Secretary McCrellish of the promotion Company invited all the travelers on the stage stopping at that point to send telegrams to their friends at his expense accompanying his offer with a stirring recital of the wonders of the Morse invention. That his hearers were impressed may be judged by the statement of one of the travelers, Harris Newmark, prominent California pioneer who says in his Memoirs—"It may be hard for you to conceive in this modern age that passing a message to an operator at a clicking instrument would be one of the most exciting episodes in a man's life but the remembrances of this experience at the little wayside station was never to be blotted from my mind."

Once the ball was set rolling, fairly rapid progress was made and in October, 1861, Governor Downey of California sent the first message—one of congratulations to President Lincoln on the establishment of the first trans-continental circuit and on November 7, 1861, the line was thrown open to the public.

Of keen interest to us now are the reminiscences of former Western Union employees who recall in vivid detail the varied experiences of the '70s. Five of the seven employees comprising the force of the Los Angeles Western Union office in 1862, are still living, most of whom are occupying prominent positions in the community.

General Frank C. Prescott, prominent attorney and one of this number, relates in vivid detail many of the recollections of former days. On one occasion every spare minute in a period of two days was spent trying to raise San Juan Capistrano, 100 miles to the South, now famous as the site of the Franciscan Mission formerly located there. At the end of this period he finally received a sleepy response and proceeded to berate the luckless individual at the other end with fervid gusto. The chap listened for a minute or two and then supplied a retort which ended the proposition—it seemed he owned a matter of 100,000 acres thereabouts and simply "operated" for his own amusement. He had been attending a rodeo—being something of a Spanish Don and couldn't be bothered by a little thing like a wire call.

Messages received for "Lucky" Baldwin, millionaire sportsman, for delivery to his famous Santa Anita ranch were regarded as blessings in disguise. The ranch was some distance from the city so Prescott would sally down to the city corral, hire a mustang for a dollar and a half and ride out to the rancho in style. Prescott's uncle, George B. Prescott, and Thomas A. Edison sold the duplex patent to the Western Union Telegraph Company.

Another interesting character whose eyes glisten with the sparkling incidents of the "olden golden days" is Edwin H. Reese of Glendale, Calif., who arrived on the Coast by the way of Panama in '68. It was while Reese was an operator in the San Francisco office in '69 that Chas. J. Shepherd was sent from the Northern City to be the first Los Angeles Manager for the Western Union Telegraph Company. At that time little was known of the Southland except that it was "the wilds" so Shepherd was forced to depart for his new home amid the good natured banter of his fellow operators who viewed his journey like a trip to Mars.

In the '60s when the trans-continental wire was opened, the Western Union had a fish-tailed flag reading "W. U. Tele. Co." flying from the mast over the San Francisco office at 520 California Street to indicate that the "overland" was working. When a business man wished to send an Eastern message he would walk to the door of his establishment to see whether the flag was flying—if not he knew that the wire was down, probably knocked out by a rambunctious steer butting over a post since the iron wires were strung on trees, fence posts or other wavering supports.

"In those days" relates Reese, "the check was transmitted after the message. When a long one would bob up, the sending operator would just signal 'long' so you wouldn't know how many words were coming your way until he finished sending."

At that time the rate for a ten word message between Los Angeles and San Francisco is said to have been $2.50 which only serves to indicate more strongly the value of the matchless service of the present day for the tariff levied.

Next we hear of the sending of the first message from Los Angeles to Phoenix, Arizonia, on November 20, 1873, part of which read "Send us your railroad and we will send you some Apaches."

And thus we flit rapidly to the story of today so

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well known to all and we cannot be too grateful to these veterans of other days for the privilege of peeping at the scenes that are "gone but not forgotten."

Wavelength Versus Kilocycles

By Walter A. Cohen, (in The Wireless Age.)

THE Radio Conference at Washington recommended that the tuning adjustment of a broadcasting station be expressed as a frequency in kilocycles rather than as a wavelength in meters. The present texts and most articles until recently have used the wavelength terminology, so that some of the fans had difficulty in tying up meters with kilocycles. For the benefit of these, the present article is written.

The transmission of a broadcasting station is not limited to a single frequency or wavelength but for the proper transmission of speech or music, so called side band frequencies are necessary including in all, a band of about 10,000 cycles or 10 kilocycles. As the frequency varies inversely with the wavelength, the number of meters included by this 10,000 cycle band will vary with the wavelength upon which the station is operating. Thus, at 200 meters, a 5,000 cycle band either side of the fundamental would include wavelengths from 199.3 meters to 200.7, a band of only 1.4 meters, while at 600 meters, a 10,000 cycle band would include wavelengths from 594 to 606 meters a band of 12 meters. Thus it is seen that the new method of expressing the frequency in kilocycles rather than the wavelength in meters is by far the easiest and by far the most comprehensive system to use. This is the basis of the new broadcasting schedule where by the country is divided into districts and each station is separated in a given district from the next by at least 10,000 cycles thus obviating interference and permitting simultaneous operation of stations.

Knowing the wavelength it is quite easy to compute the frequency by means of the simple formula shown below:

$$n = \frac{v}{\lambda}$$

where n equals the frequency in cycles, v the wavelength in meters and v the velocity of propagation of electromagnetic waves 186,000 miles or 300,000,000 meters (almost) per second. Substituting in this formula for 200 meters, we arrive at the following results:

$$n = \frac{300{,}000{,}000}{200} = 1{,}500{,}000 \text{ cycles}$$

This is rather a large number to express and handle conveniently and so, for convenience, we divide v by 1,000, expressing it in kilometers instead of meters and our result n is then expressed in kilocycles, in the present case, 1,500 kilocycles, a much more convenient figure.

Conversely, knowing the frequency, we may obtain the wavelength by transposing the above formula and we then have:

$$\lambda = \frac{v}{n} = \frac{300{,}000}{1{,}500} = 200 \text{ meters}$$

A Dark Past Justifies A Bright Future

WITH the idea of emphasizing the statement that bootleggers are numerous a railroad man from the Far West remarked that "they are as thick as derails on the Illinois Central."

Now, the thing that makes derails on the Illinois Central appear numerous is that they are painted a bright color. They are bright. They can be seen.

The genius who started the custom of painting taxicabs yellow fathered an idea which has been approved of widely in the adoption of the same color by competitors in the taxicab business. Cabs painted yellow are bright. They can be seen.

The elevated railway lines in New York which during recent years have steadily lost traffic to the subways are painting their cars a bright color, replacing the sombre, muddy browns formerly employed. Already the elevated cars, as of old, are gaining business and the stairways leading to the platforms of elevated lines once more resound to the tread of numberless brogans and Oxford ties, shuffling upward toward the turnstile or the ticket window.

The moral of the movement is that bright things attract the attention. Brightness and cleanliness invite association. Bright colors dispel gloom; inject pep; speed-up arm and leg movements—and are to be credited with inspiring much of the best that is done in the way of good work.

We hope the I. C., does not stop at painting the derails yellow, but will go ahead and set the fashion for railroads by brightening up the scenery and fixtures all along the line.

Phoebe Snow will return soon from her long vacation.

Station WJZ of Radio Broadcast Central Reopens

AFTER a brief period of silence, during which time extensive research and experimental work has been in progress, WJY, the twin station of WJZ at the Radio Corporation of America's dual broadcasting station Radio Broadcast Central located in the Aeolian Building, New York City, on December 1st, resumed broadcasting during its former periods on Tuesdays, Thursdays, Fridays and Sundays on 405 meter wave-length.

The reopening of the 405 meter channel re-establishes the unique dual broadcasting installation which is an exclusive feature of Broadcast Central, permitting two distinct programs to be broadcast on different wave-lengths from closely associated antennas. The programs from station WJY will be of the same high standard which has characterized station WJZ, including symphonic, classical, and popular music, noteworthy speeches and dinners, and events of major interest to the public.

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Deaf Woman Hears Orchestra by Radio for First Time in Forty-five Years

DURING the past few months considerable attention has been called to the virtues of radio as a cure for deafness, but seldom has a more striking example of its efficacy been shown than occurred at the Hotel Commodore on Sunday evening December 2nd, where WJZ was broadcasting the Sunday Evening Concert of the Commodore Orchestra. The orchestra, one of the finest stringed "miniature symphonies" in the country, had been playing for over half an hour when a gentleman, a resident guest of the hotel, stepped to the table on which the amplifying apparatus employed by WJZ for "direct wire" broadcasting and asked one of the operators if his wife could put on the ear-phones for a moment. The operator consented, and the lady donned the radio "Ear Muffs." In a moment a surprised and delighted smile appeared upon her face, and after a few minutes of "listening-in" she returned the phones to the operator. After a moment of animated conversation between husband and wife the husband stepped to the operator's side and remarked "For the first time in forty-five years my wife heard music just then; she has been sitting close to the orchestra all evening and could hear none of their playing, but for some reason which I don't pretend to understand she heard the concert perfectly when she tried the phones. I cannot thank you enough for letting her try them."

If the delighted couple's plans have already materialized the lady is now listening to the concerts by the Hotel Commodore Orchestra in her own room, as received on a quick purchased set, as broadcasted by station WJZ, instead of sitting in the midst of silence a few feet from the orchestra in main foyer—and is in all probability listening to hundreds of other radio concerts from all over the country as well.

Grandsons of the Telegraph

WHEN Samuel F. B. Morse, the inventor of the telegraph, gave up art for science he seemed to pass on his musical and artistic gifts to his descendants. Two of his grandsons are distinguished, one as a piano-player and the other as a painter, though America does not benefit by their presence. Their home is London, where Frank Morse-Rummel, the painter has been showing his work done in Lapland, while his brother Walter has frequently made melody in the concert halls. *The Graphic* (London) gives reproductions of the pictures done in those northern climes, and we quote the brief accompanying comment:

"The pictures are simple in treatment, and the coloring is vivid, without the slighest suggestion of crudeness. All are decidedly modern in trend and feeling, and the artist shows a very complete knowledge of drawing. One is inclined to grow weary of exhibitions of pictures whose only merit lies in the fact that they attempt to show the modern trend in art, without expressing any appreciation of the ordinary principles that have governed artistic efforts through the ages; but Morse-Rummel, in his masses and contours, gives all the detail that other painters so laboriously and painstakingly express. In black and white it is impossible, of course, to convey any impression of the color beauty of the pictures.

"It is only possible to illustrate the extensive field covered, which includes decorative figure-panels, portraiture and landscape. As regards the front-view portraits, it will be seen that the artist in some cases has thought it sufficient merely to indicate the nasal feature."—*Literary Digest,* New York.

Facts About the Telephone

THE city of Montreal, which in 1880 had less than 200 telephones, now has 100,000 telephones in service.

The city of Chicago has almost twice as many telephones as the entire continent of South America.

The Western Electric Company lost one American and 100 native employees in the great Japanese earthquake.

New York City has over five times as many telephones as all of Russia, and nearly twice as many as the whole of France.

The officials of a Wisconsin company publicly appeal to the hunters not to shoot the insulators off the telephone poles of that company.

The Japanese earthquake destroyed 16 telephone exchanges and 82,000 telephone lines which included practically all of the telephone facilities of Tokio and its surburbs.

There are 4,853 miles of wire in the average sized Bell telephone central office, enough to reach from San Francisco to New York and half way back across the continent.

The Hawthorne works of the Western Electric Company at Chicago is now the largest manufacturing plant in Illinois, employing 33,700 men and women which is about five per cent. of the total working force of Chicago.

PROJECTED RADIO STATION IN ROUMANIA.—Business circles in Constantza are much interested in a projected radio telegraph plant. The present radio station at Constantza is used for little more than the distribution of shipping intelligence. Bankers and shippers generally want not only radio telegraph and telephone connection with Western Europe, but also with Constantinople, Piræus, and Odessa. The construction of such a station has secured the approval of the Ministers of Communication, Finance, and Industry and Commerce and, with a certain supply of German material now on hand, it is expected that the enterprise will soon take definite form at a cost of approximately 800,000 lei. Private business men volunteered to make up this total, to be returned to them later in the remission of taxes. The only cable service from Constantza is over the former German cable to Constantinople.

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STUDENT'S COURSE IN TECHNICAL TELEGRAPHY

By Louis Casper

Lesson 86

It has been stated in these Lessons that ordinary duplex repeaters, which may be used for repeating signals transmitted in either direction from multiplex terminal apparatus do not correct distortion in the signals. The Multiplex regenerative repeater receives the incoming signals and retransmits them by a rotary distributor in the same manner as signals are received and sent by a multiplex terminal distributor. The re-transmitted signals on leaving the repeater are therefore regenerated or restored to their original length.

The regenerative repeater of the type described in the previous Lesson is arranged so that one or more channels may be terminated at the repeater station and equipped with multiplex operating sets or with extension sets.

With each regenerative repeater two duplex sets are required. The terms "regenerative repeater" does not include the duplex sets.

In the Western Electric type Rotary Repeater the distributor is equipped with nine pair of rings mounted on three faces, (fig. 213). The front face has three pairs of rings, designated the lamp rings, the start rings and the A. C. rings. The middle face has three pairs of rings designated the sending East rings, the local West rings and the receiving West rings. The third face has three pairs of rings, designated the sending West rings, the local East rings and the receiving East rings. The brushes that pass over these rings are driven by a synchronous motor, which in turn is driven by a tuning fork in the same manner as the terminal multiplex distributor. The repeater is not equipped for connection; the repeater station sets the pace. The sending rings of both faces are offset one segment with reference to the receiving rings.

The brushes are all directly driven from the phonic wheel motor. These distributors as applied for repeaters have no provision for orientation. The wiring is brought to terminals for connection to the associated apparatus.

The receiving rings East, local rings East, and sending rings West are on one face of the distributor and the receiving rings West, local rings West, and sending rings East are on another face.

In order to observe the relation of the received impulses to the segments of the receiving rings, a ring of lamps connected through the ballast lamp to positive battery is provided, the same as in this type of terminal multiplex set. These lamps are connected to the segments of a ring on the front face of the outer of a pair of rings designated the lamp rings. This ring has the same number of segments as the outer receiving rings and the two receiving brushes and the lamp brush are adjusted always to occupy corresponding positions on their respective faces. The inner of the lamp rings is connected to a contact of the lamps relay, so that when the relay is operated to the right a local circuit is completed if at that particular moment the brush is on a segment connected to a lamp.

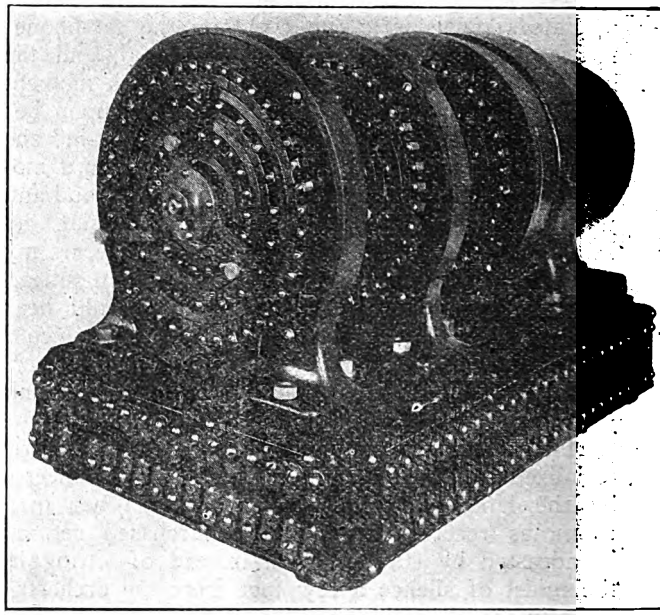

Fig. 215

The lamps relay is connected in series with the receiving side of the duplex set by throwing the lamps key for the side to be observed. The lamps relay will then respond to the received signals, the same as the auxiliary line relay. (Lesson 85). The signal received on a receiving segment will therefore, at the same time, be received on the corresponding lamp. The arrangement is such that the lamps East and lamps West Keys can be operated one at a time but not simultaneously.

A sounder is provided arranged to be connected to the tongue of either the East or West auxiliary line relay by throwing the Morse receiving Key East or the Morse receiving Key West, respectively. Only one of these Keys can be operated at a time.

Direct Point Key.

The two component units of the direct point Key are operated together. These Keys cut out the regenerative repeater and connect the two duplex sets to form a direct point repeater.

Repeat Back Keys.

The repeat back Keys are used for adjusting the sending and receiving faces of the distributors at the terminal stations. Morse sending Keys are provided

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by which direct Morse signaling can be had similar to that of regular type direct repeaters.

A. C. Keys are provided in conjunction with the A. C. ring on the front face of the distributor for sending alternate, positive and negative impulses to either line for the adjustment of duplex repeaters and other apparatus in the line. By the operation of the A. C. East or West Keys, the inner A. C. ring is connected to the East or West line respectively and positive and negative line battery is connected to alternate segments of the outer A. C. ring through the battery taps for the corresponding lines.

Starting Operation.

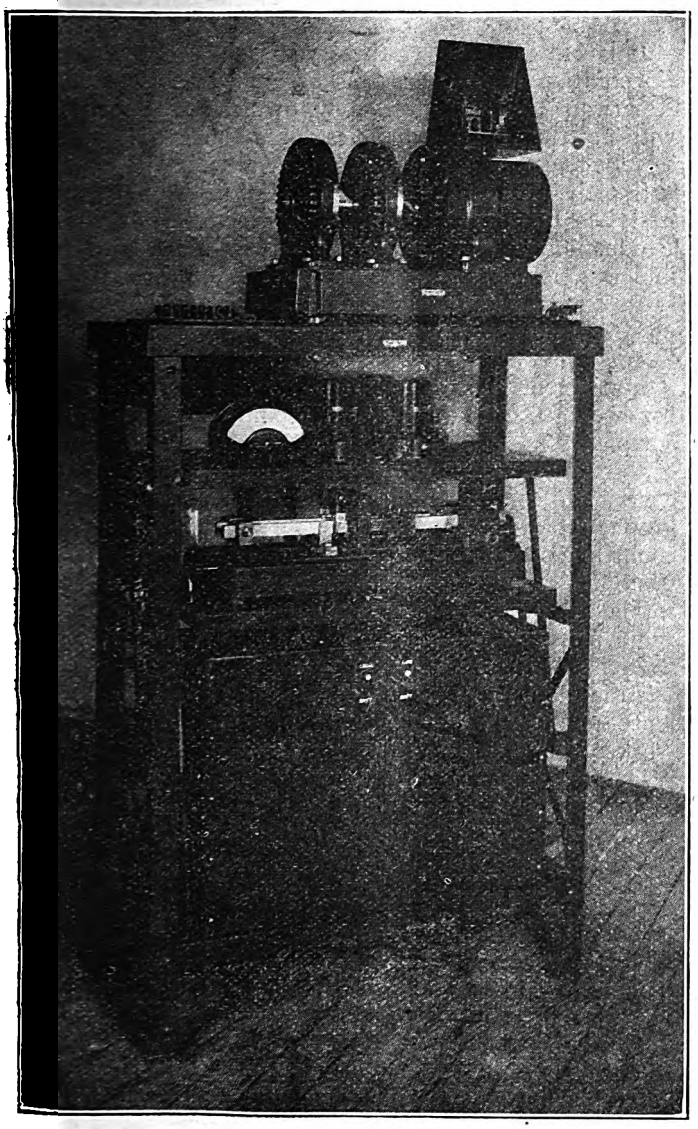

FIG. 216

The following procedure is followed in starting the operation of a multiplex line equipped with this type regenerative repeater.

1. At both the East and West terminal stations the phasing and lamp Keys are operated. At the repeater station both repeat back Keys are operated. At both repeater station and the terminal stations, a single negative impulse is now being sent during each revolution. The impulse from the repeater station in one direction, if Eastward, lights one of the lamps at the East terminal stations; if Westward the impulse lights the lamp at the West station. If the speed of the terminal distributor is different from that of the repeater, the succession of impulses, one a revolution, lights one lamp after another appearing to travel around the ring. Also, the phasing signal that the terminal station is sending out will be received at the repeater somewhere on the receiving segments and will be repeated back, or will not be repeated back, according as it is received on a repeating channel, or on a drop off channel. This impulse will always appear stationary irrespective of whether the speeds of the distributors are the same or not, but will appear and disappear according as to whether the impulse is received at the repeater on a repeating channel, or on a drop off channel or forked channel. At the terminal station therefore two impulses are lighting the lamps, one derived from the repeater which is steadily visible while traveling around the lamps, and one originating at the terminal station visible only at times and always appearing at the same position on the ring of lamps.

2. The speed of the distributor at the terminal station is adjusted by making use of the impulse sent from the repeater.

3. The receiving ring at the terminal station is adjusted until the signal on which the speed was checked falls on its proper lamp.

4. The sending ring at the terminal station is adjusted until the other impulse originating at its segment 1, falls on lamp 1.

5. The phasing and lamp Keys at the terminal station are restored. The operator at the repeater station notes that these Keys have been restored from the character of the signals received on the line ammeter and restores the repeat-back Key for the given line.

6. When both repeat-Keys have been restored, the line is ready for operation.

In the event of trouble on the line on one side of the repeater caused only by loss of synchronism the operation of the circuit is not disturbed necessarily at the opposite side between the repeater and the opposite terminal.

Fig. 216, is a picture of a Western Electric terminal Multiplex set. Two such sets strapped together make one Rotary repeater set, the instrument layout of one set being reversed on top of the table.

Note. The writer is indebted to J. H. Bell and other engineers of the Western Electric Company for information and data contained in Lessons 85 and 86.

MINOR M. DAVIS of North Chatham, Mass., in remitting to cover his subscription for another year writes:—"I thank you for renewing my subscription. I began with the first number and mean to keep on as long as I last."

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EDITORIAL COMMENT

Telegraph and Telephone Age and Its Readers

We thank those of our friends who have taken occasion at the approach of the holiday time to write numerous letters of felicitous greeting to this journal and wish for it continued prosperity. These have come from a number of persons representing all grades in the telegraph service, from members of the operating force, from chiefs, from managers, from superintendents, and executive officials. It is pleasant to receive such kindly expressed messages of "peace and goodwill"; they make friendships more true and binding, they stimulate courage on the part of the editor, publisher and all who are instrumental in producing Telegraph and Telephone Age; they place the stamp of approval upon the efforts that have been put forward to publish a journal acceptable to its readers. We wish it distinctly understood that this paper is deeply sensible of this expression of goodwill which has come to us in such generous measure. It will serve to stimulate its conductors to continue to follow out the program that has marked its course in the past forty-one years. We rejoice at the testimony offered that so many have been prompted to greater ambition in life through the editorial teaching of this paper, and that the goal of success has frequently rewarded our effort. It must be ever thus. The telegraph needs good men; it is within the reach of every man who earns promotion to receive due recognition. Telegraph and Telephone Age wishes its readers a Happy New Year! and when a year hence we, or possibly whoever may succeed us, takes in the retrospect of the year gone, may it record hopes realized and a larger courage inspired.

AN OUTSTANDING TELEGRAPHIC ACHIEVEMENT

Lee Lemon Makes Success of "Via R. C. A."

In a democratic country where government ownership and operation of public utilities has little public support progress is a result of competitive enterprise.

In a domestic way the United States and Canada are well served by two large competing telegraph systems. In intercontinental, transocean telegraphy the situation is somewhat different because of the fact that the machinery of only one end of a system is located in America. The other end of the connecting link is in each instance located in a foreign country and subject to restrictions, control and regulation in harmony with the interests of foreign governments.

Intercontinental telegraph companies therefore have an international aspect; basically there is no opportunity for monopoly, so that across the oceans we have not government ownership of the entire service, nor competition limited to two major organizations, but a number of competing systems each one privately owned, or partly owned by foreign governments.

Across the Atlantic there are the Western Union cable system, the Commercial Cable system, the French Cable Company's system, the British "All Red" circuits, and the group of seven radio telegraph duplex circuits, the American ends of which are owned and operated by the Radio Corporation of America.

It is but a little over three years since the Radio Corporation of America was organized as a purely American Company, privately owned, to compete with existing cable companies for a share of transatlantic and transpacific telegraph traffic.

Shortly after the Radio Corporation was organized Lee Lemon was appointed Director of Traffic Production with headquarters at New York and to him was assigned the undertaking of building up a gross traffic load for the radio circuits which would make possible a paying telegraph business for the Corporation.

Mr. Lemon was well chosen for this big task. He has been a successful official of competing telegraph companies in the United States throughout a period of thirty-five years; first with the Baltimore and Ohio Telegraph Company and later with the Postal Telegraph Cable Company—in the service of the latter company occupying various important executive positions.

The fact that within a period of three years the radio message load across the Atlantic has grown to approximately one-third of the existing transatlantic file is an indication of the energy and experience exercised by Mr. Lemon in organizing the work of his department.

On the Pacific the Radio Corporation handles approximately one-half the message traffic between the United States and Japan and between the United States and Hawaii.

Dependability

By Dr. Frank Crane

A man's permanent value rests on his dependability. The first question asked is, "Can we depend upon this person?" A man may be clever, capable and agreeable, but if you cannot depend upon him you do not want him around. To be dependable we must be dependable in all things, little and big at all times, in all places, under all circumstances. We cannot be dependable if we have weak health, weak character and a weak will. The dependable man keeps as straight in the dark as in the light. You know that wherever he is put he will not lie, he will not steal, he will not cheat, he will not do any mean or contemptible thing.

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Maver's American Telegraphy

We have just been able to purchase quite a large number of copies of Maver's "American Telegraphy" at a Government sale of these books. These books, we learn, are part of a large number that were forwarded by the publisher to the various supply depots of the United States Signal Corps in the early part of 1918. The books that we have been so fortunate as to secure were sent to the Signal Corps Supply Depot, San Antonio, Texas, but apparently never reached their proper destination, and after the war were found in one of the government warehouses in San Antonio, among the hundreds of thousands of other miscellaneous articles purchased by the government at that time.

As the book in question, "American Telegraphy," was out of print until the San Antonio allotment was released for sale, our readers are fortunate in being able to obtain copies of this standard educational work on telegraphy and at a price, namely $5.00 per copy, which the publisher informs us is very much below the price at which the book could be reproduced today, owing to the great advance in printing costs. Address orders and make remittances to Telegraph and Telephone Age, 253 Broadway, New York.

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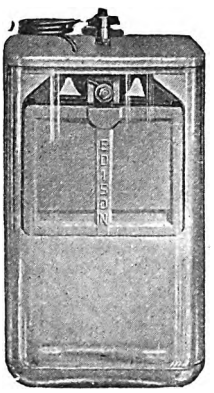
LOW COST FIGURES

As the cost of inspection and maintenance is made up chiefly of inspectors' or linemen's expenses enroute, the use of a single battery of high capacity, capable of taking care of all functions at a station for a period of two years or more without attention or renewal, brings maintenance figures way down.

CONSTANCY OF VOLTAGE

For telephone and telegraph work four Edison cells having a rated capacity of 200 ampere hours (type 202) or 250 ampere hours each (type 252) are recommended. Both will give full rated capacity, even though in service for years. There is no deterioration on open circuit. In service of this kind, the voltage remains practically constant throughout the entire life of the cells.



EASE OF INSPECTION

Little attention need be paid to Edison cells once they are set up. A patented feature—panels in the lower portions of the zinc—tells the condition of the elements. The first perforations appearing in the panels warn that the elements are approaching exhaustion. Supplied with heat-resisting glass jars, the elements in Edison cells are easy to inspect at all times, even though it is unnecessary to inspect them until they approach exhaustion.

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

A MEETING of Sub-Committee "G"—Apparatus, Material and Tools of Committee No. 2—Construction and Maintenance—Inside Plant, will be held at 431 South Dearborn Street, Chicago, on Tuesday, Wednesday and Thursday, January 8, 9 and 10. The first day's session will convene at 10:00 A. M.

A MEETING of Sub-Committee "K"—Installation and Maintenance of Committee No. 2—Construction and Maintenance—Inside Plant, will be held at Chicago, on Tuesday, Wednesday and Thursday, January 8, 9 and 10.

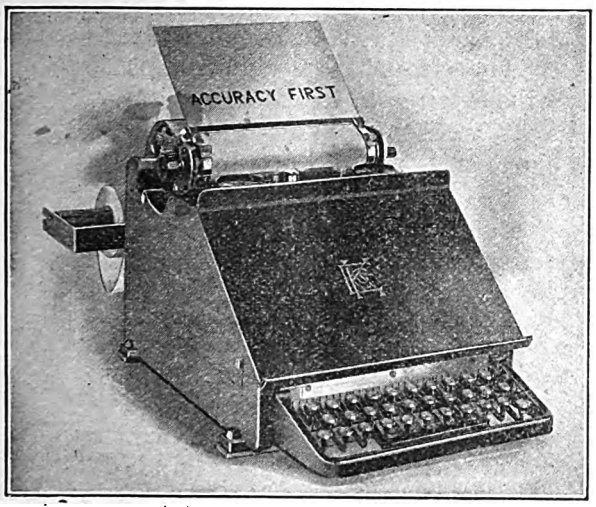
A MEETING of Sub-Committee "A"—Construction and Maintenance of Pole Lines, Wires and Cables of Committee No. 1—Construction and Maintenance—Outside Plant, will be held at 431 So. Dearborn Street, Chicago, Ill., on Tuesday, Wednesday and Thursday, January 22, 23 and 24. The first day's session will convene at 10:00 A. M.

A. V. Kipp

A. V. KIPP has been appointed assistant general freight agent of the Union Pacific Railroad at Salt Lake City, Utah, vice H. E. Godwin, advanced to the position of senior assistant general freight agent. Mr. Kipp began his railroad career with the Chicago, Rock Island and Pacific Railroad in 1901, as telegraph operator at Winterset, Iowa, later being transferred to Council Bluffs. He entered the Union Pacific service on September 6th, 1902, as telegraph operator in the dispatcher's office at Omaha; subsequently being transferred to telegraph office, general office, Omaha. In April, 1910, Mr. Kipp was made traffic agent with headquarters at Rawlins. In June, 1910, he was travelling freight agent at Denver, Colo., and in June, 1915, contracting freight agent at Denver. In 1918 he was granted a leave of absence on account of being in the service of the government during the war, as district representative, traffic department United States Food Administration at Denver. In January, 1919, Mr. Kipp returned to the Union Pacific Railroad as traffic agent at Denver. On March 1st, 1920, he was appointed general agent at Butte, and on August 1st, 1920, he went with the Salt Lake and Utah Railroad Company at Salt Lake City, as general freight and passenger agent. On March 1st, 1921, Mr. Kipp was made traffic manager for the same company, which position he occupied when appointed assistant general freight agent of the Union Pacific System at Salt Lake City.

Edi-Swan Base Adapter

FOR use where vibration and jars are likely to loosen the resistor from a standard screw socket, the Ward Leonard Electric Company have developed a Vitrohm Resistor Unit with Ediswan (bayonet lock) base. This unit, like other standard Vitrohm Resistor Units, is made for reducing regular line voltage to meet the requirements of so-called "low voltage" devices, motor-generator sets, etc.



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Nelson Avenue and Manley Street, Long Island City, New York

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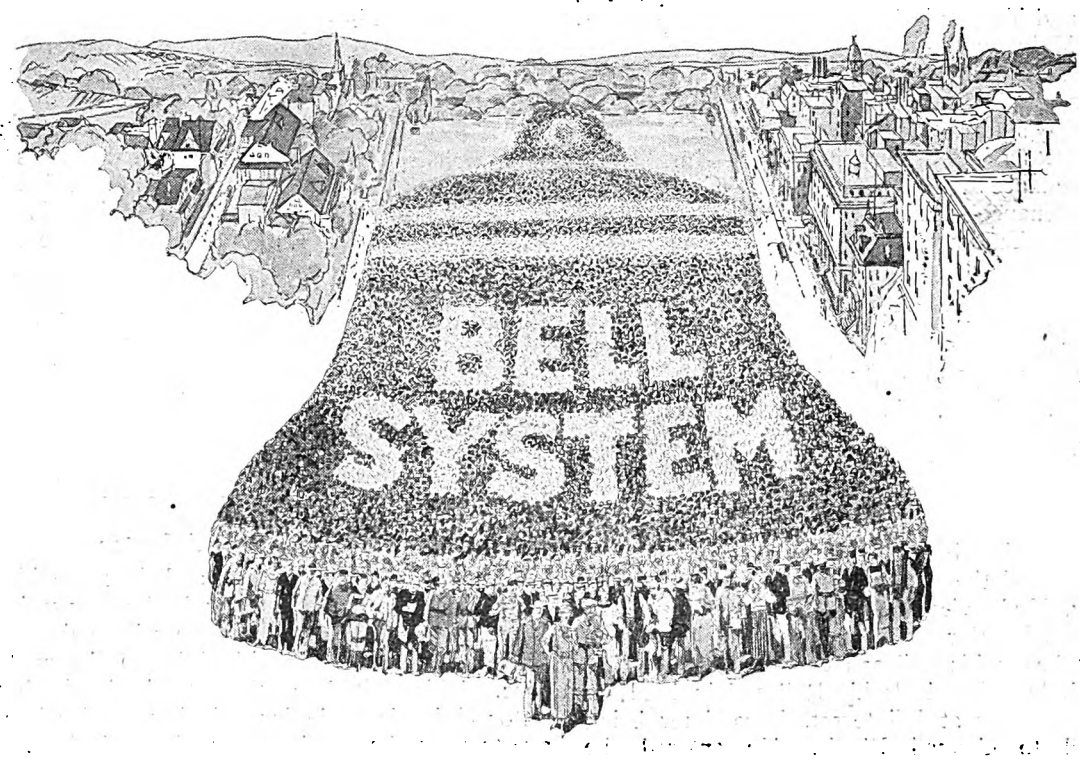

Giving the Telephone Life

Wherever your thought goes your voice may go. You can talk across the continent as if face to face. Your telephone is the latch to open for you any door in the land.

There is the web of wires. The many switchboards. The maze of apparatus. The millions of telephones. All are parts of a country-wide mechanism for far-speaking. The equipment has cost over 2 billion dollars, but more than equipment is needed.

There must be the guardians of the wires to keep them vital with speech-carrying electrical currents. There must be those who watch the myriads of tiny switchboard lights and answer your commands. There must be technicians of every sort to construct, repair and operate.

A quarter of a million men and women are united to give nation-wide telephone service. With their brains and hands they make the Bell System live.

"BELL SYSTEM"
AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
One Policy, One System, Universal Service, and all directed toward Better Service

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POSTAL TELEGRAPH-CABLE COMPANY

New York City

HARRY CUDDY, operator on the Baltimore circuit was married to Miss Francis Polk several months ago.

Mathew Feely, operator, has returned to duty at this office, after having worked several years at the Boston main office.

Many of the Banner Winners while in New York attending the Magnetic Club Dinner, called to view the Multiplex Department and other points of interest. All were given a cordial reception by Manager Coney, who furnished guides to take them about.

Managers Appointed

C. O. REIDLING, Fostoria, Ohio; H. K. Griggs, Salem, Ohio; F. B. Snowden, Barberton, Ohio; Miss Margaret Thornton, Carbon Hill, Ala., J. F. Holder, Livingston, Ala.; L. E. Thompson, Monroe, Mich.; E. J. Dillon, Medina, N. Y.; I. Ashabraner, Franklin, Ky.; L. R. Grace, Lawrenceville, Ill.; C. C. Buckner, Bowling Green, Ky.; John Rehn, Lodi, Calif.; R. J. Sundstrom, New Bedford, Mass. and Donald Burt, Batavia, N. Y.

Fall Dinner of the Magnetic Club

THE Fall dinner of the Magnetic Club, an organization whose membership is confined largely to officers and employees of the Postal Telegraph-Commercial Cables System, was held at the Hotel Astor, New York City, December 11th, and considerably more than 400 members and guests attended.

As has been the custom for some time past, the Banner Winners in the semi-annual business getting contest were guests of the Postal Telegraph Cable Company, while a number of distinguished communications men were guests of the Club. Among the latter were John L. Merrill, President of the All America Cables, Inc., David Sarnoff, Vice President and General Manager of the Radio Corporation of America, and representatives of the Canadian Pacific Railway Telegraphs and the Illinois Central Railroad Telegraph Division.

William C. Daviet, President of the Magnetic Club and Vice President of the Postal Telegraph-Cable Company, presided, and after his opening remarks he introduced the Banner Winners. He next called upon Edward Reynolds, Vice President and General Manager of the Postal Telegraph-Cable Company, who delivered a few words of greeting to the out-of-town visitors and then dwelt upon the advantages of cooperation among all communication branches of The Mackay System, and also of cooperation among the allied companies. His remarks were received with enthusiasm.

Mr. Merrill, of the All America Cables, was the next speaker and he expressed his pleasure in the fact that his company was affiliated with The Mackay System.

Mr. Sarnoff, of the Radio Corporation, referred to his early association with The Mackay System, with which he began his business career in this country. Then he took up the matter of international communication and expressed the belief that all of the various agencies for international communication should and could be harmonized. "Radio," he said, "is not to supersede the older forms of communication. Each must supplement the other and only through cooperation can there be brought about efficient communications. We are all delighted to cooperate."

W. D. Neil, of the Canadian Pacific Railway Company's Telegraphs and J. E. Drewry of the Illinois Central Railway also made brief remarks, and then the evening was turned over to the Entertainment Committee, which had provided an excellent program which lasted until close to midnight.

On the day preceding the Magnetic Club dinner, there was a luncheon and a dinner for out-of-town members of the Postal Telegraph organization. Both were held at the Hotel Astor. At the luncheon, which was to Banner Winners and other representatives of the Commercial Department, Vice President C. A. Comstock presided, while at the dinner to Plant, Engineering and Traffic men, Vice-President J. F. Skirrow presided.

THOSE PRESENT WERE

Atlanta, Ga.—J. O. Young, G. W. Ribble, H. A. Carroll, Miss E. Cronin, G. W. Oliver, W. A. Coppage.

Aurora, Ill.—T. J. Stoeckel.

Asheville, N. C.—R. R. Rayburn and wife.

Albany, N. Y.—C. A. Richardson, L.J. Barton.

Augusta, Ga.—F. A. Luck, F. L. Walters.

Buffalo, N. Y.—J. R. Morris, H. D. Reynolds, J. S. McIntyre, L. J. Reynolds, R. H. Dyer.

Bridgeport, Conn.—N. A. Aaron.

Baltimore, Md.—E. S. Middleton.

Boston, Mass.—Miss R. Carlisle, P. J. Macken, Miss E. M. Mobbs.

Baton Rouge, La.—L. I. Bennen.

Binghamton, N. Y.—H. W. Schwarting.

Birmingham, Ala.—J. M. Martin, E. C. Ford.

Brewster, N. Y.—C. G. Cramer, W. Lauber.

Charleston, W. Va.—H. H. Mull.

Cedar Rapids, Iowa—G. A. Clemens.

Chicago, Ill.—Thos. D. Lane, S. H. Mudge, E. W. Collins and wife, W. L. Simpson, E. C. Hackler, Miss M. F. Schwitzmer, J. Nering, Miss J. F. Beckwith, Miss J. Nelson, Miss N. Veale, S. Balassa, J. J. Weigel, A. W. Evans, Miss M. McCable, J. D. Murphy.

Cleveland, Ohio—F. C. Hamilton, G. W. Mitchell, F. Schweinfurth.

Charlotte, N. C.—K. F. Stiles, J. C. Phillips.

Cincinnati, Ohio—Miss M. Steele, Geo. Earman.

Columbus, Ohio—L. J. Peters.

Chatham, N. Y.—J. E. Spear.

Detroit, Mich.—R. T. Baker, R. M. Armour, Miss M. F. Corbett.

Denver, Colo.—Thos. Tyne, M. J. Gorman.

Dallas, Texas—J. Hargrave.

Erie, Pa.—J. C. Purches.

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Ebensburg, Pa.—W. F. Penatzer.
Elmira, N. Y.—M. Rourke.
Hollidaysburg, Pa.—H. Durham.
Hartford, Conn.—O. A. Tyler.
Indianapolis, Ind.—A. C. Huggins.
Jackson, Miss.—T. B. Scott.
Kansas City, Mo.—F. J. Wallace, Miss Ellen Hughes.
Lansing, Mich.—M. C. Halladay.
Lexington, Ky.—C. H. Waggener.
Los Angeles, Calif—U. S. G. Nye, C. A. Holzer.
Libby, Mont.—Miss Margaret Hunter.
Minneapolis, Minn.—Miss Bertha Saunders.
Mt. Joy, Pa.—T. Conlin.
Milwaukee, Wis.—Miss J. Young.
Memphis, Tenn.— J. E. Drewry.
Montreal, Que.—S. L. Elliott.

New York.—L. Schwartz, C. F. Leonard, E. Kimmey, W. H. Schlaefer, J. Barry, C. J. McDonald, Miss M. Way, J. J. Esmonds, D. F. Mallen, F. E. McKiernan, A. S. Babcock, H. A. Smith, C. Prossen, S. J. Duncan, T. N. Powers, J. Shandley, H. M. Harrison, C. Burnell, H. Armstrong, Chas. S. Almes, H. Amster, O. J. Adamec, F. V. Anderson, S. Burde, Thos. J. Berreen, W. J. Borden, Herbert Buchanan, S. K. Babcock, F. J. Brown, E. A. Berger, F. J. Block, George Clapperton, Frank Cohen, C. W. Cram, A. F. Connery, A. H. Clarke, Chas. Cuccia, Wm. J. Deegan, J. A. Dupius, H. B. Dibbs, Maynard Dodd, Thos. M. Drew, W. G. Ernst, Wm. C. Fitts, Cornelius P. Flood, F. E. Fisher, Wm. Fitzpatrick, Frank F. Ferranti, A. S. Franz, J. F. Fitzgerald, Arthur G. Fisher, E. T. Flanagan.

J. C. Gefvert, D. H. Gage, Francis Garalo, F. B. Gerrard, P. J. Garvey, M. F. Geigle, A. C. Goldberg, Overton Harris, H. F. Horbig, J. L. Harkins, Frank P. Huether, W. A. Hoffman, A. C. Johnson, A. F. Kavanaugh, Walter Kelly, Wm. L. Kearney, T. P. Lowery and wife, A. Linquist, J. V. Love, John J. Logan, J. P. McGuire, B. Munson, H. H. Matthews, Edward McCormack, J. A. Martini, R. H. Miller, John J. McKearney, Wm. L. Meeks, J. H. Mayer, Edward McNally, W. C. Michner, J. H. Murrary, J. McGuiro, R. B. Naugle, C. B. Obst, Esmond O'Brien, N. C. Pangburn, Clarence M. Phillips, Frank W. Phelan, F. A. Pirie, F. P. Phillips, Mrs. F. P. Phillips, F. G. Payne, J. Quinlan, F. Rauh, H. B. Reynolds, J. E. Shine, N. J. Spinosa, Jos. Siegel, D. J. Suriano, R. W. Trent, Robt. J. Tyrrell, A. C. Teller, J. J. Wallace, J. J. Williams, R. E. Walsh, F. J. Woessner, H. Zweifel.

J. F. Adams, Chas. Alvord. A. Auslander, Mrs. G. Beach, Harry T. Boylan, Francis D. Bourke, P. J. Colins, H. J. Casserly, Ralph Carr, C. A. Comstock and wife, D. A. Creary, S. N. Carpenter, Miss Marion Cooper, Walace A. Dunne, Jas. J. Donoghue, C. W. Daggett, Wm. Dennin, J. G. Dorsey, A. J. DeSteffan, Geo. A. Franks. I. Feldman, Wm. Finley, Miss Lena Ferranti, John J. Griffin, Howard Graham, R. Gould, L. W. Gumaer, S. H. Geller, Thos. S. Holmes, T. J. Horan, J. F. Henry, R. J. Hall, Thos. V. Jordan, F. J. Kernan, C. R. Kennedy, A. A. Kramer.

Albert Lister, A. M. Levinson, F. Lissner, Miss L. M. Loeffer, Miss May McGinty, W. J. McNickle, Al Montouri, J. J. Maguire, J. J. Murray, James A. Mooney, M. A. McConnell, C. P. McInerney, Wm. McCarty, J. F. MacArthur, Miss M. Mascola, A. J. Motto, A. W. McNeill, J. F. McNeill, A. Maggio, T. A. Murphy, J. J. McDermott, G. A. Niccolls, E. Nielsen, A. S. Nigrelli, Jas. C. O'Brien, J. P. O'Donohue, E. C. Platt and wife, J. J. Priviter, F. Piscitello, M. Pertka, W. J. Pallas, A. E. Pezzello, Jas. Russo, Miss M. Rybold, D. Regan, Chas. Ruffer, Miss K. Smith, Edward F. Seery, Henry L. Stein, C. Shirley, Leonard C. Sheld, L. Starace, W. Starace, D. Sullivan, J. F. Shugrue, Miss B. Shankowitz, Jos. W. Tasca, Wm. W. Tolley, E. P. Tully, Miss R. Weisenberg, R. F. Wittgens, A. J. Ward, J. F. Whitaker, F. J. Wilbur, H. E. Wilson, W. M. Wolff, W. Walsh, T. C. Zoebelein.

T. J. Brookington, E. A. Coney, Miss R. Cook, C. Fucci, J. L. Goffio, P. A. Hickey, J. Howell, Mr. Homnick, C. J. Hogan, Mrs. C. M. McGrath, Miss E. J. McGrath, M. A. Meehan, J. S. Martin, F. F. Horton, G. J. O'Brien, C. M. Rierdan, Walter Redlefsson, S. J. Stultz, Mrs. R. G. Twooney, Miss E. C. Weiss.

J Allord, Martin J. Brooks, W. P. Brown, Miss C. D. Benz, M. W. Blackmar, Mrs. M. W. Blackmar, J. M. Barry, Herbert J. Cooney, M. T. Cummiskey, H. J. Coghlan, J. J. Cardona and wife, Mrs. H. G. Dyer, W. C. Daviet and wife, J. S. Ellis, J. L. Farrell, V. F. Fiori, S. B. Gensler, John F. Gibbons, John Goldhammer, R. M. Hitchcock, Miss C. Hartwig, J. Howard, E. J. Huber, W. J. Kavanaugh, I. A. B. Kellogg, Miss E. J. Kernan, Miss M. T. Knoll, Arthur Lockwood, C. F. Leonard, James Leary, G. T. Mitchell, E. T. McKeon. Miss M. F. Moriority, Wm. J. Mitchell, John J. McArdle, C. H. Maurer, N. A. Malpas, J. T. Needham, Chas. J. O'Connor, F. A. O'Keefe, Mrs. A. W. Porter, N. C. Pastrof, A. B. Parrish, Miss E. A. Patterson, C. R. Rimpo, Phil. J. Rebecca, E, Reynolds and wife, D. G. Rogers.

J. F. Skirrow and wife, Peter E. Solaski, G. B. Steinberg, C. J. Smith and wife, W. V. Stahl, T. H. Tierney, J. J Tobin, E. M. Underhill, Miss E. Wittgens, S. E. Ostrom, E. J. Rathes, L. O'Toole, Wm. V. Stahl, D. J. Bonoui, Wm. B. Dunn, Miss Pylier, J. A. McNulty, Miss F. O'Day, J. Sheffery, Mrs. H. Sheffery, Miss C. Porter, W. Schreiber and wife, Miss D. Hellard, D. Mahoney, J. Havice, W. S. Hallett, Miss M. Dunne, F. H. Dennis, Jr., E. D. Thornburgh and wife, W. D. Neil, J. E. Spear, Miss Vogt, Mrs. A. C Hudson, Miss G. Murphy, J. H. Bearns.

New Orleans, La.—J. T. Remley, Miss Z. Bush.
North Adams, Mass.—H. Copley.
Orlando, Fla.—Miss M. K. Davidson, R. G. Summers.
Oakland, Calif.—Samuel Wachsman.
Philadelphia, Pa.—H. A. Lewis, C. E. Bagley and wife, C. F. Meyers, W. G. Kurtz.

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Pittsburgh, Pa.—W. R. Hall, H. Scrivens, W. J. G. Cooper, H. H. Liggon.
Plattsburg, N. Y.—C. M. Baker.
Redlands, Calif.—Hugh Mitchell.
Reading, Pa.—D. Rhein.
Schenectady, N. Y.—H. G. Roth and wife.
Springfield, Mass.—G. P. LeClaire and wife.
Syracuse, N. Y.—J. W. Weed.
St. Louis, Mo.—Miss M. Lutz, J. Klautzer, S. H. L. Recht.
San Francisco, Calif.—R. H. Stone, A. B. Richards.
Seattle, Wash.—H. E. Patton.
Wilmington, Delaware—W. P. Maguire.
Washington, D. C.—Miss E. Horan, L. A. Bickerton, G. A. Francis.
Waterbury, Conn.—O. Olsen.
Wichita, Kansas—W. L. Meeks.
Yakima, Wash.—Albert Stevens.

Commercial Cable Company

J. S. OAKS, assistant superintendent at Weston-super-Mare, England, has been pensioned from January 1st.

J. J. DELEHANTY, assistant traffic manager, who is inspecting the Company's European stations has visited London and Waterville, and is at present at Liverpool. He will shortly leave for the Northern British stations.

Harry Wood of the New York Electrical Staff, is at present at Havre, France, in connection with the installation of special apparatus for the operation of the new cable.

Commercial Pacific Cable Co.

SUPERINTENDENT P. J. HARWOOD left Manila for Honolulu by the Steamship "President Cleveland" on December 20th, 1923 and will assume charge at Honolulu on his arrival.

Technicalities

A WHOLE lot of the folks are pretty well posted on technical points concerning operations, and so are apt to forget that what seems perfectly plain to them may sound like Sanscrit to the newcomer.

Which reminds us of the description of a machine once upon a time installed in a machine shop. "By means of a pedal attachment a fulcrumed lever converts a vertical reciprocating motion into a circular movement. The principal part of the machine is a large disc that revolves in a vertical plane. Power is applied through the axis of the disc and work is done on the periphery and the hardest steel by mere impact may be reduced to any shape."

The machine was a grindstone.

What is wisdom but having a great deal to say and keeping it silent?

WESTERN UNION TELEGRAPH CO.

Western Union Telegraph Company Earnings

A RECORD YEAR IN 1923

THE Western Union Telegraph Company is probably ending the best year in its history. It is estimated net applicable to the $99,786,727 stock will be at least $15 a share, against $13.19 last year, $9.65 in 1921 and $14.40 in 1917, the record year.

Estimated earnings for nine months ended September 30, after taxes, charges, etc., was $10,000,504, equal to $10.02 a share. The best quarter is the last, while the first three months of the year are the poorest.

Operating costs in first half of year were $3,677,000 larger than 1922 period. A good portion of this was as result of charges for employees' income participation, while there were no such charges in 1922.

In second part of 1922 the company responded to the improvement in business conditions. With improvement shown in many lines during the last two months it would appear the last quarter of 1923 will make a brilliant showing. The Western Union Telegraph Company, though slow to reflect depressed conditions, has always shown a ready response to good business. A period of activity in Wall Street, for instance, has an immediate effect on the company's land lines and cables. Although the financial district represents but a small portion of the company's business, it is an important revenue source both from leased wires and from the large volume of countrywide business which centers there.

Althought 90% of the company's gross is derived from its land lines, President Carlton has been actively engaged in developing the cable department, which he said needed stimulus. He pointed out that the service of the Radio Corporation of America had made inroads into cable business and the result of his efforts has helped the cables to regain some of the business lost to radio. Mr. Carlton is also gaining success in his efforts to increase the cable service with South America. Western Union Telegraph is already doing a good business with leading centers of South America. Mr. Carlton has completed arrangements with the British whereby the cable to Italy which is to be connected at the Azores can be landed. Britain raised a barrier of legal formalities which Mr. Carlton has removed and it is only a question of a short time when the direct cable to Italy will be working together with a cable to Germany.

EVERY MAN AND WOMAN SHOULD READ
CONSCIENCE AND SUCCESS
By
Fernand E. d' Humy
This little book will greatly benefit every reader. Its simple lessons will show you how to make your life a happy, wholesome, successful one. You will become surrounded by loving friends and you will delight in doing for others.
If you read this book once, you will read it many times. Send for your copy now. Bound in art boards 111 pages, $1.00 postpaid.
TELEGRAPH & TELEPHONE AGE

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Eastern Division

FRANK C. FRENCH, formerly operator at Ossining, N. Y., has been promoted to the managership at Dobbs Ferry, N. Y., vice Kenneth Falconer.

Mrs. G. E. Wooster, manager at Auburn, N. Y., is on vacation and is being relieved by Miss Irene McNaney.

Mrs. H. G. Cleere of Geneva, N. Y., has left for a two weeks vacation period.

Miss Ruth E. Daniels has been appointed acting manager at Hoosick Falls, N. Y. while Miss E. M. Fraher is on vacation.

Miss Lillie Burns of Lake Placid, N. Y., has returned from a vacation trip spent at her home at Dunkirk, N. Y. During Miss Burns absence the office was in charge of Miss Lois G. Dewey.

CHARLES R. TILGHMAN, general supervisor of Ticker Service, on the staff of the General Superintendent of Plant, is in the Community Hospital, New York City, as the result of being attacked December 7 by an infuriated drunken man.

Mr. Tilghman was returning from a Masonic meeting at Newark in company with several other Western Union men, when, without warning, he was attacked at 181st Street and St. Nicholas Avenue by a man crazy with drink. Mr. Tilghman was knocked down and unconscious and received a compound fracture of the collar bone, a fracture of the shoulder blade, lacerations of the face and head and other body bruises. Although fifty-five years in the Company's service, and getting along in years, he is improving rapidly and expects to be back at his desk shortly.

His host of friends all over the country wish him a speedy and thorough recovery.

THE usual Christmas party of the General Manager's office was held on Monday afternoon, December 24th. The room was decorated and many visitors enjoyed the festivities.

Radio Corporation of America

A. E. NICHOLAS, superintendent, Cleveland, Ohio, was a New York official visitor in December.

LEE LEMON, director of traffic production, New York spent a few days in Boston recently on official business.

FRANK R. CARNEY, division representative, Chicago, has returned to his office after an official trip to cities in his division.

WALTER H. NIEMANN, of the traffic production department, Chicago, has returned home for the holidays after an extended trip to midwest cities.

MISS HELEN BAUMRUK of the Chicago office is known all over the Windy City as the "Via RCA" girl with the voice that wins on the "fone."

THE FLAG DISPLAY which adorns the front of the Radio Building, 64 Broad Street, New York, attracts the attention of all who visit the Wall Street district. The flags of the Nations are artistically grouped and mounted where they may be seen for some distance.

MANY of the Postal managers who attended the Fall dinner of the Magnetic Club in New York, on December 12, availed themselves of the opportunity to visit the big operating room of the Radio Corporation of America at 64 Broad Street, where seven radio duplex circuits are in continuous operation to European countries.

EFFECTIVE January 1, C. H. Taylor, heretofore assistant chief engineer, becomes chief communications engineer, and Dr. A. N. Goldsmith, heretofore director of research, becomes chief broadcast engineer of the Radio Corporation of America. Dr. E. F. W. Alexanderson, heretofore chief engineer, resumes his duties with the General Electric Company, but will serve as consulting engineer to the Radio Corporation of America.

Edward J. Nally, managing director of International Relations, accompanied by Mrs. Nally spent the Christmas holidays touring through South France by automobile, Mr. Nally's official headquarters are in Paris.

ANOTHER VICTORY FOR THE VIBROPLEX

Martin's New and Improved Single Lever Vibroplex

IN the suit just concluded of the Vibroplex Company, Inc., vs. J. H. Bunnell & Company, of 32 Park Place, New York, N. Y., U. S. District Court, Southern District of New York His Honor, Judge Learned Hand held the sending machines of the defendant to be clear infringements of one of the patents owned by The Vibroplex Company, and ordered an injunction accordingly. The machine held to infringe was that recently devised and advertised by Bunnell & Company under the name "Gold Bug" and the courts directed the defendants to recover all machines which they had sent to customers.

In this suit the third of the patents issued to Horace G. Martin was involved, and it was the same patent that was held infringed in the recent suit of the Vibroplex Company against Wm. A. Zeidler Co. This THIRD Martin patent covers the perfected, single lever, double contact machine, and in holding said patent valid and infringed in the said Zeidler suit, the Court clearly recognized the superior merits of the apparatus over all others by declaring that it "has nearly supplanted all other forms" of sending machines.

OBITUARY

Thomas P. Wheeler, Pioneer Telegraph Operator, Dies.

THOMAS P. WHEELER, age 76 years, pioneer telegraph operator of St. Louis, died of infirmities of age on December 17th.

Entering the telegraph business not many years after telegraphy was invented, Mr. Wheeler became one of the most expert operators in the business, and was one of the last old-time "lightning slingers."

He was one of the first operators to copy at high speed the reports of press associations, when operators copied the matter with pens. Most of his working hours, were at night; yet in spite of the heavy

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strain on his eyes he never had to wear glasses.

Joining the Postal Telegraph Cable Company when it was organized, more than thirty years ago, Mr. Wheeler held the position of night chief operator at St. Louis, for approximately thirty years. He was retired with a pension two years ago after a physical collapse. Four or five years previously he had been retired, but insisted so strongly to be classed among the active members of the company that he was reinstated.

Credited by associates with writing one of the most perfect Spencerian forms of handwriting ever seen, he was held in high esteem by his employers because of the exemplary life he led. Often he was termed by officials of the Postal Telegraph-Cable Company as the most faithful telegrapher in the profession.

Mr. Wheeler, who was a bachelor, is survived by his sister, a niece of Kansas City, and a brother in Oregon. He had hundreds of acquaintances among telegraphers of the city.

He was buried at Walnut, Kansas.

J. B. Norris, former manager of the local branch of the Western Union Telegraph Company, died on December 21st at the Chattanooga hospital. He was eighty-one years old and was born in Kalamazoo, Mich. He recently came to Chattanooga from California in ill health. He was well known to Chattanoogans, having been an active figure before his retirement from the telegraph company after a long service, 1894. He is survived by a niece.

William R. Benzie, one of Colorado's best known mining men died at his home in Denver, of pneumonia, on December 15. The disease was contracted in Leadville where he had gone on an important mining deal. Mr. Benzie was well known to the telegraph fraternity in the West, having been employed by both companies. He commenced his telegraph career with the Western Union Telegraph Company at Chicago, working in the delivery department of that city under that splendid old time delivery clerk William Frazer, who took charge of the Western Union delivery department of the Chicago office, when but five messengers constituted the force at the Main office for the entire city of Chicago. Later, Mr. Benzie succeeded Mr. Frazer as delivery clerk, resigning when L. D. Parker of the Postal Telegraph-Cable Company offered him the management of the new office at Denver. Mr. Benzie opened the Denver office July 1st, 1890, becoming its first manager. After a period of two years he resigned to enter the mining business, making that his life's work. Of W. R. Benzie it may be said: He had many friends, and although his own burdens were heavy, his cheerfulness and affability made life more pleasant for those with whom he came in contact.

Carroll Thweatt Syndor died on November 15, from a complication of diseases, at the home of his daughter, Mrs. B. M. Long, in Ginter Park, Richmond, Va., and was buried in Blandford Cemetery, Petersburg, Va. on November 17th.

Mr. Sydnor had an active business and telegraph career, associated with the telegraph in connection with many cotton houses and the brokerage business, in which he was personally interested, in the South.

He entered the commercial telegraph service by aligning himself with the Postal Telegraph Cable Company at Richmond, Va., in June, 1890, and served in various positions with that Company, and was for many years the manager of its Richmond Office. Owing to loss of hearing, he retired from managerial work some years ago. He was one of the oldest employees in point of service and endeared himself to employer and employee alike, and although on the retired list of the Company continued to spend a part of his time at the office daily until a short time prior to his death.

Mr. Sydnor was a member of the Presbyterian Church and of Strict Observance Lodge No. 207, F. & A. M., and a well-known and respected citizen of his community. For many years he handled the affairs of the Telegraphers' Mutual Benefit Association in Richmond.

Mr. Sydnor was the son of the late Capt. Jos. A. and Mary Virginia Sydnor of Petersburg. Besides his wife, he is survived by two daughters and one son.

Electric Show in Melbourne

An electrical exhibition under the auspices of the Victoria Electrical Federation, will be held in Melbourne during September, 1924. It is planned to cover every phase of the electrical industry, showing actual working models of the various types of apparatus from toys to machinery, transport, lighting and other industrial equipment. Both wireless telegraphy and telephony will have prominent places in the exhibition.

The duration of the affair will be for four weeks.

International Radio Telegraph Convention

Esthonia, Fiume, Brunie and Reunion, have declared that they will recognize and adhere to the rules of the International Radiotelegraphic Convention of July 1, 1923.

Independent Telephone in England

The Hull, Yorkshire, England, Municipal Telephone System, during the first six months of 1923 shows a profit of over $45,000.00, after paying about $25,000.00 in royalties to the British post office.

High Speed Radio Station in India

Good progress is being made with the erection of a high-speed radio installation to operate between Rangoon and Madras, and it is hoped that the scheme will be in working order before the end of the year.—*Indian Engineering.*

Self-Opener

Teacher—Willie, your mouth is open.

Little Willie—Yes, miss, I know. I opened it myself.

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TELEGRAPH INSTRUMENTS

There is a constant demand for all sorts of telegraph instruments, and this publication is prepared to fill orders for this class of goods the same day they are received if the goods are in stock. These include:

Dandy Learner's Set, 20 ohms, $4.00.
Dandy Learner's Set, 4 ohms, $3.80.
Beeko Learner's Instrument, 4 ohms (key and sounder combined on one base), $3.30.
Beeko Learner's Sets, 20 ohms, $3.50.
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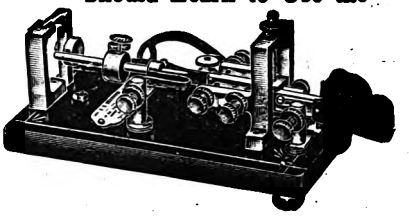

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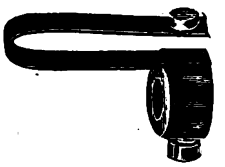

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CONTENTS

PAGE

Some Experiences with a 202-Mile Carrier-Current Telephone-Hand. By E. A. Crellin..... 26
Waldorf-Astoria Sunday Concerts from WJZ..... 28
What Radio Broadcasting Offers the Farmer. By General James G. Harbord 29
International Communication. Electric Light and Power Wire Hazards..... 31
Distortionless Amplifier. What Rate Reductions Have Meant..... 32
Speaking of Wiring for Flowers. Felix J. Koch. Radio Stations in Mexico. Long Distance Telegraphy in Turkey. American Orchestral Concerts to be Broadcast by WJZ..... 33
Old Times at "187" Broadway. By Old Timer..... 34
Student's Course in Technical Telegraphy. By Louis Casper. Lesson 87.... 35
Radio Corporation of America. All America Cables. Say Operator's Mistake Cost Ford South Dakota..... 37
Editorial Comment—Communication Engineering. Intelligence in the Delivery Department. Telegraph and Telephone Life Insurance Association..... 38
Railroad-Telegraph and Telephone Section of the American Railway Association. Long Service. Philadelphia Local Telegraph Company. Radio Stations. 41
The Morkrum "Teletype"..... 42
To Telegraph Employees. Electrical Aid Society of Philadelphia..... 43
Postal Telegraph-Cable Company. Commercial Cable Company. Rum Schooner is Blamed for Broken Cable..... 44
Western Union Telegraph Company..... 45
Canadian National Telegraphs..... 46
Obituary. A Military Telegrapher in the Civil War..... 47
Still Holds Her Secret. By Wix..... 48
An interesting Underground Cable..... 49
Good Morse Operators..... 50

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Some Experiences with a 202-Mile Carrier-Current Telephone—Hand

By E. A. Crellin

On April 11th, 1923, the Pacific Gas and Electric Company placed in operation a carrier-current telephone system between Pit River Power House No. 1 and Vaca-Dixon substation. This system utilizes the twin-circuit 220,000-volt transmission lines between the two points for a conducting medium and is for use primarily by the operating department in directing the operation of the power houses in the Pit River development together with the transmission lines which carry the energy southward to the distribution center at Vaca-Dixon sub-station. With the commencement of work on Pit River Power House No. 3 an increasing volume of messages is being received from the construction and auditing departments for transmission to the general offices of the company, and it is already apparent that additional carrier-current telephone sets will be required, one at the base of construction operations for Power House No. 3 and one at Claremont sub-station in Oakland to relieve the congestion on the wire line between Vaca-Dixon sub-station and the local dispatcher's office.

During the six months from October 1922 to the inauguration of the carrier-current telephone, the operation of the Pit-Vaca transmission system was directed by wire lines. In the absence of direct wire communication between the load dispatcher's office at Oakland and the power houses in the Pit River system, it was necessary to relay all messages one or more times which introduced a considerable delay and was subject to error, especially in view of the inductive interference usually encountered on telephone lines paralleling transmission lines. Since the carrier current telephone was placed in operation in April it has answered all dispatching requirements, and as the operators become more and more familiar with the peculiarities inherent in such a system its many advantages over the wire lines become more and more apparent.

The system is coupled to the transmission line through a single-wire antenna about 1800 feet long. This wire is attached to the twin vertical circuit transmission towers at a point on the center line of the towers and at the elevation of the middle arm. The main ground system for the station apparatus is also used for the carrier-current telephone ground and no counterpoise is used. The frequency adopted, after a series of tests ranging between 12,500 cycles and 85,000 cycles was 50,000 cycles. This is free from all outside interference and gives the best combination of signal strength and voice modulation.

The transmission equipment is similar to that installed in several of the highpowered broadcasting stations in some respects, and employs two 250-watt oscillator tubes, two 250-watt modulator tubes and a 50-watt speech amplifier tube. It is appreciated that this is a relatively high-powered transmitter and for all normal conditions of operation such an amount of power is not necessary. However, communication is more urgently needed during periods of abnormal condition than at any other time and it is then that this excess power is called upon to get the message through.

Calling is accomplished by mounting a standard telephone microphone in the horn of the loud speaker which, when the calling circuit is completed, will oscillate and howl in much the same manner that the ordinary telephone will howl when the receiver is placed against the transmitter. This gives a very loud note whose pitch will depend upon the natural period of oscillation of the diaphragm and which is clearly audible in all parts of the station. Ordinarily, it is not necessary to use the calling system, as the receivers are always in service and the operator near the set so that the loud speaker simply talks at him and he starts up his set and talks back.

The system is arranged for simplex operation and all that is necessary is to operate a small telephone switch which energizes a contactor to connect either the transmitter or receiving set to the antenna, thus permitting talking or listening.

Normal rating of the 250 watt tubes used is based upon a filament lighting supply of 11 volts and a plate pressure of 2000 volts. With the transmission line in operation and all conditions normal it is possible to obtain an antenna radiation of 6.2 amperes with the tubes operated at rated voltage. This gives a received signal at the other end of the 202 mile transmission line considerably louder than necessary. The receiver is a standard regenerative set using two stages of audio frequency amplification to operate a loud speaker, and speech can be heard all over the power house when maximum amplification is employed. For regular service, therefore, the filament lighting supply on the transmitter is reduced to about 10.4 volts and the plate pressure to 1600 volts, which gives an antenna radiation of approximately 5.0 amperes.

The tubes are extremely sensitive to variation in filament voltage and it has been found by experience that 10.4 volts is about as low as it is desirable to operate. Below that point it is sometimes difficult to start oscillation and sluggish operation means delay in acknowledging receipt of a message. Communication has been carried on with a radiation as low as 2.5 amperes, but with poorer modulation. With a 5-ampere radiation at the sending station the receivers are set for minimum amplification and no difficulty is experienced in handling messages.

To one unaccustomed to listening to a loud speaker, the messages are often very hard to understand and some difficulty was at first experienced by the operators who had not had previous experience with loud speakers. However, this was easily overcome after a week or so of operation of the phones and it is now rarely necessary to repeat a message.

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Routine dispatching is carried on more easily with the carrier current telephone than with the wire phone due to absence of inductive interference. A considerable volume of accounting and construction department messages is handled over the carrier current telephone and this gave trouble in some instances when it was necessary to transmit unfamiliar proper names. It usually resulted in spelling and due to the difficulty in distinguishing between certain of the consonants which are similar in sound, this did not solve the problem. The method now generally used is to try the voice once and if any difficulty is experienced the name in question is transmitted by telegraph code. The operators have been supplied with a chart on which the Continental code is printed in large clear letters and those who have not memorized the code simply pick out a letter at a time and transmit it by means of the calling key. This may sound slow but in reality it is quicker and more positive than several voice repetitions of the letters composing the name in question. Naturally more speed is attained by the operators familiar with the code, and without exception all of the operators are taking a very great interest in the carrier current telephone and are practicing with the code during the shift between midnight and five o'clock in the morning when other duties are at a minimum. It is desirable that the operators become used to the telegraph code and able to transmit five or ten words a minute because certain forms of line disturbance make voice transmission difficult and still permit of distinguishing the letters of the telegraph code which comes through as a high-pitch note of constant tone, readily distinguished from other noises. It is also possible to transmit the code when abnormal conditions make it difficult to secure sufficient radiation to give good voice modulation.

All operation of the carrier-current telephone to date has been carried on with one of the 220-kv. transmission lines still incomplete. The first work was done with two transmission lines complete from Vaca to Williams, a point about 50 miles north, and a single line from Williams to Pit, about 150 miles. At Williams the two lines were tied solidly together. The copper for the second line was strung in place between Williams and Cottonwood, about 90 miles, but men were constantly at work upon the line and consequently it was solidly grounded at each tower on which a man was at work. Grounding this parallel line did not affect communication in any manner on the other line.

At present two three-phase circuits are in operation from Vaca to Cottonwood approximately 140 miles with a single circuit from Cottonwood to Pit River approximately 60 miles. The circuits are tied together solidly at Cottonwood and men are now at work on the second circuit between Cottonwood and Pit. A special test was recently made with one three-phase circuit solidly grounded at Vaca and the other circuit clear, both being tied together at Cottonwood, power, of course, being off the lines. No appreciable difference from usual operating conditions was noted in ability to communicate between Pit and Vaca.

Recently one wire on the completed three-phase circuit between Cottonwood and Pit River became grounded due to failure of a piece of insulator-hardware and resultant dropping of the wire on to the tower. This left only two wires completely insulated between Pit and Vaca with a ground on the third, but no difficulty was experienced in carrying on communication.

Communication cannot be carried on with three-phase grounds at either or both ends of the transmission line. Also, all three wires were recently grounded at Hat Creek, about three miles distant from Pit toward Vaca and communication could not be carried on. At least one wire, insulated from ground, between the two points is necessary for successful communication by carrier-current telephone.

When the transmission line is dead and isolated by opening the disconnecting switches at each end of the line considerably more power output from the transmitter is required than when the line is connected to the transformers and energized at 60 cycles. This difference is probably due to the change in transmission line constants by the removal of the reactance of the transformers which in turn cuts down on the current radiated from the antenna. When the transmission line is thus isolated the station operators immediately increase the power output of the carrier-current telephone transmitter to its maximum by raising plate and filament voltages to 2000 and 11 volts respectively. Communication is then carried on as usual and no difficulty is experienced in directing operations.

In order to carry on duplex communication, that is, to be able to send and receive at the same time, it is necessary to employ two antennas, one for the transmitter and one for the receiver. Some tests were recently made to establish the effectiveness of various types of receiving antennas. At Vaca it was possible to receive messages from Pit River when using a bushing type current transformer on one of the 220-kv. line oil switches as an antenna. The leads from this current transformer are carried in lead covered cable about 300 feet to the substation wall, thence in rubber-covered wire in iron conduit to the switchboard, an additional 40 feet. The receiver was hooked on to one terminal of the line ammeter on the switchboard. Only the reactance of the ammeter coils was between the antenna and ground. The signals received were clear, but weak. It was necessary to use the head phones with all the amplification at hand to bring it in strong enough to understand. Stronger signals were received when using secondaries of one of the 110-kv. potential transformers on the 110-kv. bus but they were not considered strong enough for use by the operators. As a matter of interest, one test was made using one side of the lighting circuit for an antenna. Very weak signals were heard which might have been brought in strong enough to be understood had a couple of stages of radio frequency amplification

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been available in addition to the two stages of audio frequency amplification which were employed. This reception was through three power transformers, *i. e.*, the main bank which steps down to 11,000 volts for the synchronous condensers, the station bank stepping from 11,000 to 440 volts and the lighting bank stepping from 440 to 110-220 with the mid point on the secondary grounded.

Finally a separate receiving antenna was strung at Vaca and also at Pit. These antennas were each about 250 feet long and placed in the most convenient temporary location. Excellent reception was obtained and the loud speaker could be operated at full volume from the short auxiliary antenna. The transmitter at Vaca was then lowered in frequency to about 30,000 cycles, with the Pit transmitter remaining at 50,000 cycles. With the Pit receiver tuned to 30,000 cycles it was not possible to transmit at 50,000 cycles while receiving because the transference of power between the sending and receving antennas was so great as to blanket out the received signals. When duplex operation was tried at Vaca, the transference of power was sufficient to arc across the grid condenser which is a 23-plate variable condenser in the receiver used. It would seem that duplex transmission is not practical with two antennas when using transmitting sets of the power output necessary to successfully talk over a 202-mile transmission line, and accordingly no further tests were undertaken.

During the initial installation of the Pit-Vaca carrier-current telephone several tests were made between the Vaca-Dion substation and the Fourth Avenue substation of the Great Western Power Company in Oakland, where a similar carrier-current telephone set is installed. There is no direct transmission line between the two substations. The Great Western feeds the Pacific Gas and Electric Company through a 60-kv. transmission line which is carried for about three miles on the same steel tower line as the 110-kv. transmission line and on the same right of way as the 110-kv. twin circuit Oakland-Big Bend transmission line to which the carrier-current telephone is coupled. The 60-kv. feeder goes into the Ridge substation of the Pacific Gas and Electric Company, and thence on to the Claremont substation. There is a parallel of some three miles or so between the 60-kv. Ridge-Claremont line and the 110-kv. Claremont-Vaca line where the two circuits are on the same right of way. At Claremont the 60-kv. and 110-kv. are tied together through auto-transformers.

Conversation is readily carried on between Fourth Avenue and Vaca, a distance of about 60 miles, and during the initial tests between Pit and Vaca, the Great Western operators were able to listen in and understand what was being said at Pit. It is believed that this is a record for distance for carrier-current telephone transmission, somewhat over 260 miles with no direct transmission lines connecting the last 60 miles to the transmitter.

The Pacific Gas and Electric Company is entirely satisfied with the results of the carrier-current telephone secured to date. Many conditions of operation have been met and the carrier-current telephone has at all times been ready to perform the duties required of it. The principal difficulty to be overcome is that of understanding the loud speaker which is simply a matter of becoming accustomed to the voice as reproduced in a loud speaker horn rather than in a telephone receiver. The operators in general seem to prefer the loud speaker to the head phones, and rely upon it at all times to receive their messages.

As stated before, the volume of traffic over the carrier-current telephone is steadily increasing and plans are already being laid for the installation of additional sets at Pit River Power House No. 3 and Claremont substation. The last named set will be remote-controlled from the dispatcher's office in Oakland and a relatively small investment in apparatus will obviate the necessity of a 260-mile metallic telephone line to handle the operation of plants in the Pit River development, and results achieved to date indicate that it will be equally reliable and a much more quiet phone to talk over.—*A. I. E. E. Journal.*

Waldorf-Astoria Sunday Concerts from WJZ

THE Sunday evening concerts by the Waldorf-Astoria Symphonic Orchestra, of which Joseph Knecht is director, on December 1st began a regular Sunday evening feature from station WJY on 405 meters. The orchestra is one of the best known in the country, and the Sunday Evening Concerts have become an institution of winter seasons. Station WJY has been arranged so that two concerts from the response which the radio audience gave they were an unusually popular feature; this season a system of alternation between station WJZ and station WJZ broadcasted these concerts last year, and will be broadcasted on the 405 meter wave and the next two on the 455 meter channel of the Radio Corporation of America's dual station. The orchestra, founded by George C. Boldte, is the only hotel orchestra which even approaches symphonic proportions; there are thirty-five musicians in the organization, all recruited from Symphony Orchestras, and Joseph Knecht, the conductor, was formerly assistant concert director of the Metropolitan Opera. The programs selected by Mr. Knecht are the same as those played by the leading symphonic orchestras of the world, and the orchestra's rendition of them has gained it an international reputation.

IT isn't how much you work, but what you accomplish that establishes your value.

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What Radio Broadcasting Offers the Farmer

By
General James G. Harbord,
President Radio Corporation of America.

Radio telephonic broadcasting, first successfully initiated on a Public Service Basis by the Westinghouse Electric and Manufacturing Company, though still in its infancy, is already practical. It promises social, political, economical, educational, and religious possibilities second only to the art of printing.

The relations of broadcasting to the farmer, group themselves naturally under two heads:

(1) Utility.
(2) Entertainment.

A very casual consideration reveals a much varied application of radio broadcasting to the interests of the farmer. Unquestionably radio emerges from such a survey as a part of the necessary business equipment of the efficiently operated farm. The radio receiving set will be to the farmer what the ticker is to the speculator in farm products. It will be the equipment which will place him on even terms with the manipulator of his markets. The dissemination of market news, weather and market reports stands out obviously as a primary function of broadcasting. It is absurd to argue with an intelligent farmer on the benefit of advance knowledge of weather and markets.

Radio may perhaps lead to a solution of many farm labor problems. During harvest or other rush seasons when labor supply is of manifest importance to the farmer, broadcasting might well call attention to available labor supply. Acting with the existing facilities for securing labor, broadcasting will enormously expand their scope. It will contribute to the fluidity of the supply, enabling farmers in need in one region to draw on the labor surplus of another.

There is no dearth of information as to proper procedure in case of animal epidemics. The problem is to make such information instantly available. Already through the public health service medical advice is afforded by radio to ships at sea without medical attendance for their passengers and crews, and lives have been saved through such wireless treatment. The farmer who in a time of emergency must act promptly either lacks the time or the inclination to consult a distant authority, nor can he safely keep a herd of sick steers or cows waiting while he wades through the mazes of many pamphlets in the hope of finding the particular treatment he wishes. The limiting factor in such cases is accessibility. The same is true of regions where insect pets are devastating crops. By giving the farmer just what he wants when he wants it, broadcasting will widely extend the emergency services of the various agencies which the government has created to help him.

Nothing in the farm field is more impressive to an outsider than the extension of cooperative action in recent years. Just as common interest is a powerful motive in cooperation, so the dissemination of common interest possible. Some of our states have Farm Bureaus in every county. Information sent out under their auspices would further the purpose of such bureaus, and get their information and their policies to the individual numbers with the speed of light. One state, for example, has over two hundred Grange Halls. The State Master is investigating radio apparatus with the idea of placing receiving sets in every such hall. The possibilities of radio broadcasting in facilitating the purposes of farmers' organizations are practically limitless. The head of a cooperative group of farm papers has figured that the territory served by his publications include over five thousand grain elevators, and about the same number of live-stock shipping associations. It at once occurs to him that every grain elevator in the region ought to maintain a receiving set in its office for business reasons. It is no less true for the intelligent individuals who constitute the membership of such organizations.

The forgoing are specific applications of broadcasting, meeting specific needs. Perhaps the greatest general utility of radio to the farmer is in tying in with the extension work of the agricultural colleges and schools and the various state organizations devoted to improvement of farm methods. Today a relatively small number of farmers, workers or owners benefit from such instruction. The exigencies of farm work do not often permit enrollment for full terms. Radio would open the door of the agricultural school to tens of thousands who would otherwise never receive such institutional instruction, and it would enable the student who has been obliged to terminate a short course to continue his studies in many cases under the same faculty. With practical men in charge of such instruction the possibilities of radio in this direction are limitless. I am told that the Club department of the Extension Service of the Colorado Agricultural College is already making the organization of radio clubs a feature of its work.

Such are some of the utilitarian possibilities of broadcasting for the farmer. But one may well doubt if this service should be placed ahead of what broadcasting can do to make the farm a happier place in which to live. The cultural and spiritual possibilities of broadcasting are a goldmine that has been scarcely touched. Every high school, and even the country schools in remote districts should have the benefits of radio. It brings them within reach of the lectures, the music, and the educational methods of the metropolis. It means an educational contribution of highest excellence to every rural school. It includes not only direct and interesting instruction to the pupils but stimulation of the interest of teachers and the increase of their efficiency. It brings music and divine service to the bedridden and the blind. From Minneapolis, for example, there is sent out by radio each Sunday A "Vespers Service", featuring music with short addresses by men prominent in church work in the great Northwest. The music of the Chicago Grand Opera Company is nightly broadcasted to the great Mississippi Valley. In my Mother's home in Manhattan I have heard Sunday

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evening services from Detroit, Kansas City, Davenport, and Dallas, Texas. I know of a case in central New York of a lady much devoted to church service, who by a radio receiving set had four services in one Sunday, starting with the early ones in the vicinity of New York and following westward with the sun, concluding the day with a fourth service broadcasted from Minneapolis. Sermons are available from the lips of America's most eminent divines, in many small communities unable to support a preacher, or whose only chance of worship is perhaps one or two Sundays a month. The radio receiving set should keep the boys on the farm and replace less desirable forms of village entertainment.

Think of sitting in your own home by a comfortable fire, tired from your day's work, and listening to the music of grand opera conscious that the voice of the prima donna reaches you by electricity on your distant farm before it is heard by the people sitting in the back row of the orchestra circle, for such is the speed of radio compared to the ordinary speed of sound.

There is but one obstacle at present standing in the way of maximum fulfillment of the possibilities I have outlined. That is the interference, caused by too many neighboring sending stations attempting to broadcast on the same wave length at the same time.

The popular opinion is that radio being through the air can be used without limit. This is decidedly an error. The spaces in what the scientists call the ether, through which radio communication can be carried on, are for the present quite limited. They are analogous to a street on which only a certain number of soldiers can march elbow to elbow. There are approximately six hundred broadcasting stations in this country operating theoretically on two wavelengths, one of 360 and one of 400 meters. The great majority of these are technically faulty, serving small communities and a limited number of persons with inadequate programs. There are about thirty large stations technical reliable and capable of serving, when not interfered with, a large area and thousands of persons with continuous and satisfactory programs. There are no direct profits to any broadcasting station, as no way has yet been devised of collecting for the service rendered. Excluding such stations as serve some government purpose, there are newspapers, automobile schools, electrical manufacturing concerns and chiropractic schools doing broadcasting, besides numerous amateurs sending miscellaneous matter for the amusement of it. The greater part of the foregoing are broadcasting for the incidental advertising their institutions receive. The practical effect is that babel of interference which every owner of a receiving set has noticed and simultaneously deprecate and deplored, where his ethics did not permit him to curse. Either the large station sending out important or entertaining matter which thousands of persons would like to receive without interruption must suffer such interference as will render its efforts unintelligible or it must yield time on a given wavelength to some small sender catering only to a limited community which would itself be better served by the larger station. Even Sundays are not sacred to these people, and the most touching and affecting church services are often interrupted by the raucous voice of some wide-mouthed barker serving an advertising agency.

There are not in the ether six hundred wavelengths available at present for assignment to broadcasting service. Under existing law the government could assign several additional wavelengths to this service, but even if these were properly allocated and staggered in order to reach all parts of our country, there could be successfully used at present not more than about fifty broadcasting stations. Those would, however, operate at a minimum interference and render a maximum of service. To maintain a simple good sending station with a satisfactory continuous daily program costs from fifty to one hundred thousand dollars per year. It is doubtful if the advertising benefits received from maintaining such a station will be great enough to justify its continuity over a considerable period. Personally I doubt if there is any benefit from such advertising. No one who has suffered from the interference of some advertising school station while trying to listen to a sermon, a lecture, or a concert rendered in first-class form from a competent sending station, would be likely to send his son to such a school,—unless possibly armed with instructions to do violence to the sending apparatus or the sender. This is not a case of big business against small, nor of the professional against the amateur. No profits from broadcasting are received by the large concerns except through the sale of receiving sets, and their interests are identical with those of the many thousands of listeners who are interfered with by a comparatively few thoughtless, or selfish and indifferent senders.

This problem of interference can only be solved by suitable governmental regulations and I have every confidence that it will be solved in the near future and, I believe, in an intelligent manner. A great many honest and industrious minds, both in and out of the Government service, are at work on this problem at present. In my opinion radio broadcasting is here to stay. It will go forward and not backward.

I have touched but lightly on the general possibilities of radio. The man does not live whose vision is keen enough to say what it may mean for the greatness of our country in the years to come. It has the intelligent backing of the best brains in the scientific world. The enthusiasm of youth is mobilized behind it. Its future is as limitless as the ether, and, wider than our world, it is unbounded even by the bending skies above us. He who is confronted with its daily questions looks to you for help in this practical work, which will bring to all an efficient broadcasting service, one which, retaining the public interest, shall become the instrument of national entertainment and education, making radio, if I may repeat, second only to the art of printing.

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International Communications

P. E. D. NAGLE, communications expert, transportation division, Department of Commerce, Washington, has compiled a very complete statement in pamphlet form reviewing the customs and usages of international communication as laid down in the publications of the International Telegraph Convention.

Presumably the material presented is intended to be of incidental value to those who may be called upon to participate in the deliberations of the next international convention promised in the near future.

The relative newness of radio telegraphy, or force of habit, evidently caused the subheads "Registered Cable Addresses", "Special Services on Cablegrams", these services relate equally to radio telegraphy.

While in the pamphlet there is much that is of interest to the user of communication—in the way of detail information—it seems an excellent opportunity has been missed to give the business public some plain facts bearing on the use of codes and ciphers.

There is little dissatisfaction with our present foreign communications either by cable or radio telegraphy that is not traceable to the employment by the public of difficult code words.

The present generation of users of telegraph service has used codes from the beginning of their commercial experiences. It would seem that no one has ever told them that codes are not devices of the telegraph companies, but rather are ingenious inventions of publishers.

Many of the codes used violate the plain requirements stated in the International Regulations, and while the Regulations set forth certain procedure to be followed in case of difficulty encountered by the users of codes, it is rarely that a code user is found who can or will recognize anything but gross mishandling on the part of the telegraph company when code messages contain irregularities.

When cable rates were originally established on a word basis there was no thought of RHLIJPIEEB being regarded as a word. The effect of the use of such combinations are to greatly increase the cost of handling per word to the communication companies; to reduce the tolls per message, and to increase the liability of error.

In Europe where the governments own and control the systems of communication the International Regulations as they relate to the use of codes are rigidly adhered to: the code user has no choice. In America, due to the strenuous competition for traffic by several companies, the effort has been and is to so perfect the machinery of operation that code messages may be handled quickly and accurately. The attitude is characteristic—and laudable, but judging from the complaints of users of complicated codes the ultimate has not yet been attained.

The Department of Commerce has evidently given some thought to certain phases of this difficulty, for in his report Mr. Nagle says:

"If it were possible to do so, a general rule admitting only two classes of language and making no exceptions of any kind would vastly simplify the practice and would eventually benefit all concerned. It has been suggested, for instance, that languages used in cables be divided into two classes—plain language and cipher language. Under this rule no distinction would be made between code and cipher and no exceptions would be made in the case of special marks or expressions common in commercial practice.

"Another proposal is to limit the length of words in cablegrams to 10 letters and to charge the same rate for all other words regardless of their length or character. This would eliminate any distinction between plain language, cipher, and code.

"It would of course be necessary to revise cable rates generally, together with accounting instructions, traffic methods, etc., but the adoption of either one of these two rules would vastly simplify everything connected with cabling. Under the first rule—that is, dividing cable language into classes of plain language and cipher—it is proposed that the use of a cipher word in any message classifies the message as cipher, and all the words in it, instead of taking the plain-language count, would take the cipher count."

Certainly the subject is of great importance to the commercial world and to the communication companies, and if the department can succeed in imparting the facts of the situation to users of service undoubtedly benefits will accrue which will reflect a new understanding.

Electric Light and Power Wire Hazards

TREAT all foreign wires as live wires and dangerous. You can't depend upon the insulation of electric light wires—treat them as bare wires and correspondingly dangerous.

When working with wires near electric light or power wires, use all precautions to avoid contact. Select the best way in which this can be done and use it.

Beware Of—

Power ground wires.

Trolley span wire attached to telephone poles.

Vertical lamp fixtures attached to telephone poles.

Drop wires sagging on to electric light service drops.

Guy wires near foreign wires.

Hand line in contact with electric light or power wires during damp weather.

Use rubber gloves where there is a possibility of foreign voltage being introduced while you are working.

Guard against falling caused by receiving a shock from power wire, secondary electric light circuits or ringing current.

Report insufficient clearances between plant and foreign wires.

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Distortionless Amplifier

CONTINUING their work of improvement of radio station WBZ in Springfield, Westinghouse engineers are putting in the latest devices and apparatus developed for better broadcasting of all types. The most recent addition to the excellent equipment of this New England station is a voice amplifier of entirely new design which reproduces and magnifies the sound impulses without distortion before they are "fed" to the station's transmitter.

To understand the importance of a voice amplifier free from any distortion, it is necessary to have an idea of this problem, an important one in transmission of the human voice and of music by radio. Sometimes, when you are receiving a distant station and you decide to "plug in" another stage of amplification, the signals which you had been getting very clearly and loud will almost loose their identity and be distorted in the extreme. The receiving and amplifying circuits must be adjusted at once, so that the amplifier will operate properly. This problem, but many times bigger and more important, is present at the transmitting station.

Station WBZ is a remotely controlled station. That is to say, the studio is at a distance from the broadcasting equipment. In this case, the studio is located in the Kimball Hotel, in Springfield, while the transmitter is located on top of the Westinghouse plant in East Springfield, a distance of approximately 4 miles.

When the artist sings or speaks into the sensitive microphone at the broadcasting studio, very little energy is released, and the electrical impulses into which the sound-waves are converted are too feeble to make the journey to the plant four miles away and actuate the very delicate and sensitive apparatus of the transmitter. It is therefore, necessary to reinforce these impulses before they start on their journey, so that they will be strong enough. This is done through the use of an amplifier. This amplifier is somewhat similar to the one used in a receiving set, but it makes use of larger vacuum tubes, and handles a larger amount of energy.

Just as with the receiving amplifier, however, if there is too great an amount of current flowing through it a given time, there will be distortion, which will be at once transmitted out into the ether, and which will be received by a normal receiving set as a signal of very poor quality. The design of these station amplifers is a great problem because of the fact that they must be made to amplify over a band of frequencies equal to those obtainable with the average orchestra, from the highest to the lowest note, and still amplify normally every tone. At the same time, they must be able to handle the necessary amount of current to operate the transmitter.

Westinghouse engineers have been studying the problem of amplification for a long time. Finally, the push-pull system of amplification was evolved. Those of you who use Radiola Grand Receivers know what excellent quality of tone can be obtained with the amplifier of that instrument. It is a push-pull amplifier which makes use of two WD-11 vacuum tubes. There is no distortion, and yet the intensity is such that it is at times necessary to cut the volume down.

An amplifier, similar in design, but capable of handling many hundred times the energy which the receiving amplifier does, has been installed at station WBZ. Because of its construction, it requires duplicate equipment throughout. Two vacuum tubes are employed where one was needed previously, two sets of batteries, transformers with double widings are other modifications which have been necessary. This duplicate layout, though necessarily more expensive in cost and operation, has several very important advantages. In the event of something going wrong with the vacuum tubes, batteries, or any part of the amplifying system, the station is not for that reason, put out of commission. The system operates continuously upon the duplicate set, which acts as an emergency system until the entire unit can be repaired quickly.

Most important of all, however, is the fact that because of this duplicate circuit arrangement, more current can be handled, and therefore, no distortion will be experienced. Perfect reproduction at the transmitting end can be had. In fact, a second amplifier, identical with the first, is installed at the East Springfield plant, so that the electrical impulses from the studio are still more strengthened before going to the transmitting set. By properly regulating all of the circuits in the amplifier system, a current intensity of almost any magnitude can be obtained. This control is a valuable feature in case the broadcasting of a singer with a very powerful voice is attempted. It would be disadvantageous to the tone and quality of the singers' voice to have the latter sing lower. However, the end can be accomplished by regulating the current intensity in the amplifier circuit, without the necessity of moving the microphone away from the artist. This control is also necessary in the case of theater broadcasts, in which the artists move about the stage, and where the voice appears ordinarily to get stronger and weaker as the speaker approaches or walks away from the microphones located near the footlights and about the stage. The operator who listens in at the station can, by a slight twist of a knob, maintain the current practically constant, so that the broadcasts will be uniform in strength.

———o———

What Rate Reductions Have Meant

THE average revenue received by the railroads for carrying one ton of freight one mile in the first eight months of this year was 1.109 cents compared with 1,212 cents in 1922 and 1,266 cents in 1921.

Translated into the freight bill of the country these figures mean that in the first eight months of this year the railroads received $431,000,000 less than they would have received for the same volume of traffic if 1921 rates had been in effect.

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Speaking of Wiring for Flowers

FELIX J. KOCH

THE exchange arrangement of the leading American florists, through which persons in any part of the country may have flowers of any kind, arranged to any desired form, and with just any type of message along, conveyed, within the hour often, to other persons anywhere else, by means of a code word, telegraphed the nearest florist is, of course, familiar to all.

Like many most-familiar things, however, it does no harm to remind people of the service, again and still again.

By way of a reminder of such a sort, a leading Cincinnati florist, (Ed. Julius Baer), devised a unique concept.

A display consists primarily of a wall-map of the United States, of such size that persons on the floor below may readily recognize any point in the same where they may have friends they would remember at any time.

For this map, then, the store-help was set to whittling odd bits of wood to wee telegraph poles and their arms; then painting these a bright green, and then setting these here and there, the map across. On these tiny poles, bright-topped tacks served to represent the glass-capped pegs to which wires are wound. Strands of stout cord were then strung from tack to tack, till the map took on the appearance of wearing the most complete, withal diminutive, telegraph system of the Western world.

Just this network of wires across the continent, with the wee little poles supporting the same, would have caught the eyes of all passers, but the builders of the display were not content to stop there.

Instead, discs the size of a silver dollar, were cut from some handy cardboard, and gummed at each central telegraph-point upon the map. Thus larger cities, in and about which most passersby might have friends, were drawn to their attention at once.

Discs of this kind are prominent on such background, of course; but they're not the handsomest things in the world. So, to relieve the monotone of them on the map, brilliant red straw-flowers, were fixed, one apiece, on each disc-center on the big map.

Radio Stations in Mexico

IT is reported that the Mexican Government has ordered four radio stations in Germany so as to connect the capital with the republics of Guatemala, Costa Rica, San Salvador, and Nicaragua.

Long Distance Telegraphy in Turkey

LONG-DISTANCE telephone communication has been established between Constantinople and Smyrna, and an additional line between Broussa and Angora is under consideration. The service is administered by the Constantinople Telephone Company.

American Orchestral Concerts to Be Broadcast by WJZ

THE arrangements for what is probably the greatest presentation of symphonic music which radio has yet attempted have been completed between Mr. Robinson of the American Orchestral Society and the Radio Corporation of America, with the result that station WJZ will broadcast the entire series of fifteen concerts which the Society, in cooperation with the New York Philharmonic Orchestra, has scheduled for the winter season. The first concert began November 25th at Cooper Union, and the series continues at regular intervals until April 8th, 1924.

The fifteen concerts are classified in three groups of five each, the first five, which are given by the Orchestral Society for the New York Philharmonic Orchestra, and the second five, composing the annual series given by the Society to the Peoples' Institute, to be held in Cooper Union Auditorium, while the third group, the Children's Afternoon Concerts, will be given in Aeolian Hall. The ten Cooper Union concerts will be played by the entire Orchestral Society, over one hundred instruments in all, under the direction of Chalmers Clifton, while the Children's Concerts will be given by an orchestra of fifty-five picked members of the New York Philharmonic under the direction of Ernest Schelling.

The Cooper Union concerts will include the symphonic debut of several young American soloists of proven ability, and the programs will contain many compositions by young Americans in addition in thirty-two of the greatest symphonies. As the American Orchestral Society is composed solely of the finest of young American players, the concerts will present the absolute best in American composers, artists, and instrumentalists. The concerts will be given on the fourth Sunday and the second Tuesday of each month till April.

The educational series of Children's Concerts, under the direction of Ernest Schelling, will present the most famous symphonic compositions with musical explanation, and will include short biographical sketches of the composers. The first of this series will be given on the afternoon of January 8th, and concerts will be continued on alternate Mondays thereafter.

Station WJZ will broadcast all fifteen concerts by the direct wire system from two halls, and extraordinary care is being taken by both WJZ and the Western Union Telegraph Company to insure the radio audience of perfect transmission of these exceptional series.

P. C. Kullman & Co., brokers, 116 Nassau St., New York City, in remitting to cover their subscription for another year writes:—"Of all the thirty-odd magazines and periodicals that come to this office, and all of which we are keeping regular files, it gives us greatest pleasure to send you our renewal. We have been binding volumes of Telegraph and Telephone Age for many years past."

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Old Times at "187 Broadway"

By Old Timer

The most interesting thing I have read in the AGE for a long time is the reminiscences of 187 Broadway, in your December 16, 1923 issue. I began my telegraphic career there at the time mentioned by your correspondent, viz: 1893.

The first thing that recurs to me is Old "Pop" Russell and his noonday time service. I believe he worked a New York State wire, and promptly at 11:55 every day he stationed one of the office boys at a window on the Dey street side of the room where he could watch the time ball on the roof of the Western Union building at 195, and as the hour of noon approached the boy would raise his arm in the air, letting it drop in unison with the time ball at 12, which was the signal for Pop to flash the exact time up state.

Harry Peters was then working Montreal, and he sent the best and fastest Morse I had ever heard. I was no slouch as a sender, but I listened with awe to "TP's" work, and was greatly disappointed a short time later when he failed to get a prize in a tournament held in New York. He must have lost his nerve. About that time I did a lot of sending on the Albany dux, and a Mr. Flood, formerly night manager at 187 did the receiving, and I will never forget how he kept continually nagging me to send fast. I suspect now that it was his way of getting back at the Albany outfit, who grilled him considerably on the receiving side. John Costello, our old friend "CE" used to pull a trick on the same order. Frequently I was sent down to "BS" office at 25 Broad street to help out, and Costello would stand back of my chair and exhort me to go on and whoop it up. Then he would go up to the main office and listen to me send, after which he would return to "BS" and bawl me out, saying "What the devil do you mean, Jack, by sending that way. This was no reflection on my sending, you understand; it was just one of John's peculiarities.

When I entered the Postal service I was put through the usual test by the genial Charlie Richardson, manager of the city line department, who was perfectly fitted for that work. Soft voiced and reassuring and a perfect sender, and one was a ham indeed who couldn't get by Charlie's little test.

Speaking of the "waiting room," your correspondent recalls vividly "Peg" Randall, the peg being a wooden one, but I never found out how he lost his leg. He was a typical old-time floater, a good operator, and jolly, and he had just one form of salutation for Dan Mallon, whenever the latter came down for an extra man. It was "Why, hello Dan, I was just going out for a glass of soda-water." Believe me, it was soda water that would take the varnish off the desk in short order. And this reminds me of "Bill" Tucker, with whom I worked "F" Chicago at night for some time. Poor Bill, he had the weakness that so many good operators had in those days—strong drink, and the more he drank the better he worked. I have seen him so he could hardly recognize his own name, but putting down fifty or sixty reds an hour, sent by some fast op. at CH., and all Swift ciphers, and that Swift cipher was enough to drive almost anybody to desperation.

Your correspondent, speaking of typewriters, especially Caligraphs, reminds me that Faulkner, then just a kid, was one of the first to use a machine regularly in the office. He worked a silver-plated Caligraph, which he won in the tournament mentioned above, and copied all kinds of stuff on it with remarkable ease. Shortly after that I was given a regular night assignment at "DAILY AMERICA," a morning paper devoted entirely to sports, and had one of my first experiences trying to be funny over the wire. Someone in the main office had just finished sending me a couple of hundred words of press, and I said "Who is this sending?" He answered with his sine, and as a joke I replied: "I thought so," and forgot all about it. A few minutes later, however, in walked, I think, "Cardinal" McCloskey, and threatened me with all kinds of dire consequences if I ever did it again. Needless to say I did not, once was enough, as he was real hostile about it.

I must not forget to mention the ladies. Two that I recall were fine operators, Kitty Sandberg and Anna Boyle, and possibly I remember them the best because of their operating ability, as I put that ahead of everything else at that time. Miss Lizzie Lahey is another outstanding personality in my memory, but more on account of her good looks than telegraphic ability, And Mamie Lee. About all I can recall of her is her slim waist, and my boyish wonder that she did not break in two. Those were the days of slim waists, and she was the slimmest I ever saw. There were also two nice check girls, sisters, named Marmon, and I will never forget how embarrassed I was when one of them stopped at my desk one day and talked to me. I thought everybody in the room must be watching us.

I could continue this reminiscing indefinitely, but will draw it to a close by mentioning Eddie Hodnutt and Jim Williams, two natural born comedians, if there ever were any; Bill Cherry, who worked Pittsburgh, and created "GX" one day by trying to jump a bill collector who managed to get in and pester him with unwelcome attention, and Charlie Cook, the genial "CC."

Well, 73 and a Happy Year to the whole bunch, and I hope they are all living and prospering.

Siemens Brothers and Company, Ltd., are at present manufacturing a cable 1,700 miles in length to connect Turks Island to Barbados, whence it would bifurcate to Trinidad on the one hand and to British Guiana on the other. The work of laying will be finished next summer.

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STUDENT'S COURSE IN TECHNICAL TELEGRAPHY

By Louis Casper

LESSON 87

Western Union Rotary Repeater

A type of rotary repeater that is in extensive use on long trunk line circuits is that designed by the engineers of the Western Union Telegraph Company. This repeater embodies many desirable features, one of which is comparative simplicity of apparatus and arrangement. This repeater is still in a further course of development.

The outstanding features of the arrangement are the receiving segments of the distributor at each side of the repeater being each divided into two portions —sending segments and "locking" segments, the arrangement being somewhat similar to Baudots repeater with auto exciter. Incoming signals operate a main line relay which repeat them via the sending and locking segments to a transmitting relay and a locking relay. The transmitting relay repeats the signals through the split point of the opposite main line relay while the locking relay maintains the transmitting relay in the operated position until the line current changes sign, when the transmitting and locking relays are reversed.

This repeater operates as a duplex and most of the apparatus involved is standard with that of the Western Union Multiplex System. The method of balancing is substantially the same as with direct point automatic duplex repeaters which have been fully described in these Lessons.

The rotary repeater consists essentially of two distributors, one for receiving and transmitting the signals in one direction and the other for receiving and transmitting signals in the opposite direction. Therefore, the speed of operation may be different in one direction than in the other provided that each terminal is equipped with a separate distributor for sending and receiving.

Each side of the rotary repeater is provided with the usual line equipment for duplex operation and in addition thereto, the distributors just mentioned. The regular main line relay is operated on the Gulstad or Vibrating Relay principle. There are three relays provided besides the main relay on each side of the repeater, viz., the corrector, transmitting and locking relays.

It will be of interest in this connection to study the action of the vibrating relay which tends to increase its sensitiveness and to reduce the distortion of incoming signals. In Fig. 217 it will be noticed that in addition to the usual line windings the relay is provided with two auxiliary windings, one an "opposing" winding and the other an "accelerating" winding. These two are connected externally to a condenser C and resistance N and to the relay tongue through a resistance P.

The theory of operation is as follows: At the instant the tongue reaches, say, the spacing contact, a current rush into the condenser takes place through the right or accelerating coil. This current is in a direction to hold the relay tongue to the left or spacing. Simultaneously a current flows into the opposing coil shown at the left of the relay and resistance P in a direction to move the tongue to its marking stop, thus opposing the current in the accelerating coil winding. The current in the accelerating coil diminishes with time while the current opposing it rises and attains a steady value fixed by the resistance N, the resistance of the opposing coil and the voltage of the local battery. At the moment when the line current is at zero, the current in the

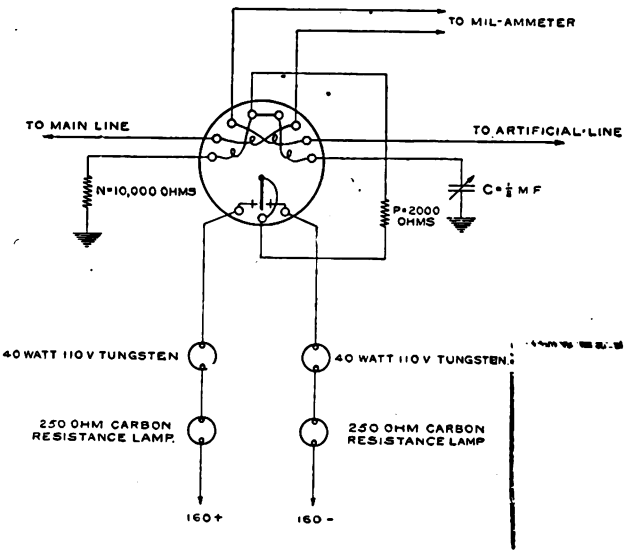

Fig. 217

opposing coil will ultimately predominate that in the accelerating coil—which may not yet be zero and the relay tongue will start to move toward the marking contact. As it leaves the spacing contact on its way to the marking contact, the battery is cut off and the condenser discharges through the accelerating coil in a direction to assist the motion of the tongue. The condenser discharge accelerates the motion of the tongue with considerable impact against the contact to which it is moving. When the tongue reaches the marking stop the same cycle of operations is repeated, the tongue now moving in the opposite direction.

The number of turns in the auxiliary windings is just one-half of those of the line windings so that a current in the auxiliary windings of the same value as the current in the line windings has therefore only half the magnetic effect upon the armature. It will thus be seen that the line current may fall to nearly half of the vibrating current value before the effective values are equal.

In contra-distinction to that of the Western Electric type rotary repeater, the Western Union repeater utilizes a method of correction which is similar to that employed at the terminal Western Union Multiplex apparatus. This consists of a corrector relay that actuates the mechanical corrector

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mounted on each distributor shaft. The control of the mechanical corrector by the corrector relay is obtained through a device consisting essentially of three relays of Craft design and is termed the Synchronizing unit. By means of this arrangement the distributor to be corrected is momentarily retarded at the instant the phase relation with the distant distributor had shifted.

As already stated the function of the locking relay is to insure that the tongue of the transmitting relay, when it has been actuated by a received signal, shall be held against its contact for the full time of a transmitted signal.

the transmitting relay would not be controlled by current through its coils when the receiving brushes moved away from the short segment and therefore any jar or slight bias might cause it to move away from its contacts before it should do so. To prevent this, and at the same time augment the signal started at the short receiving segment, all of the locking segments which alternate with the receiving segments are connected together and the entire group connected to the tongue of the locking relay. The locking relay coils are connected in series with those of the transmitting relay, so that the tongues of the two relays move in unison. Positive and negative

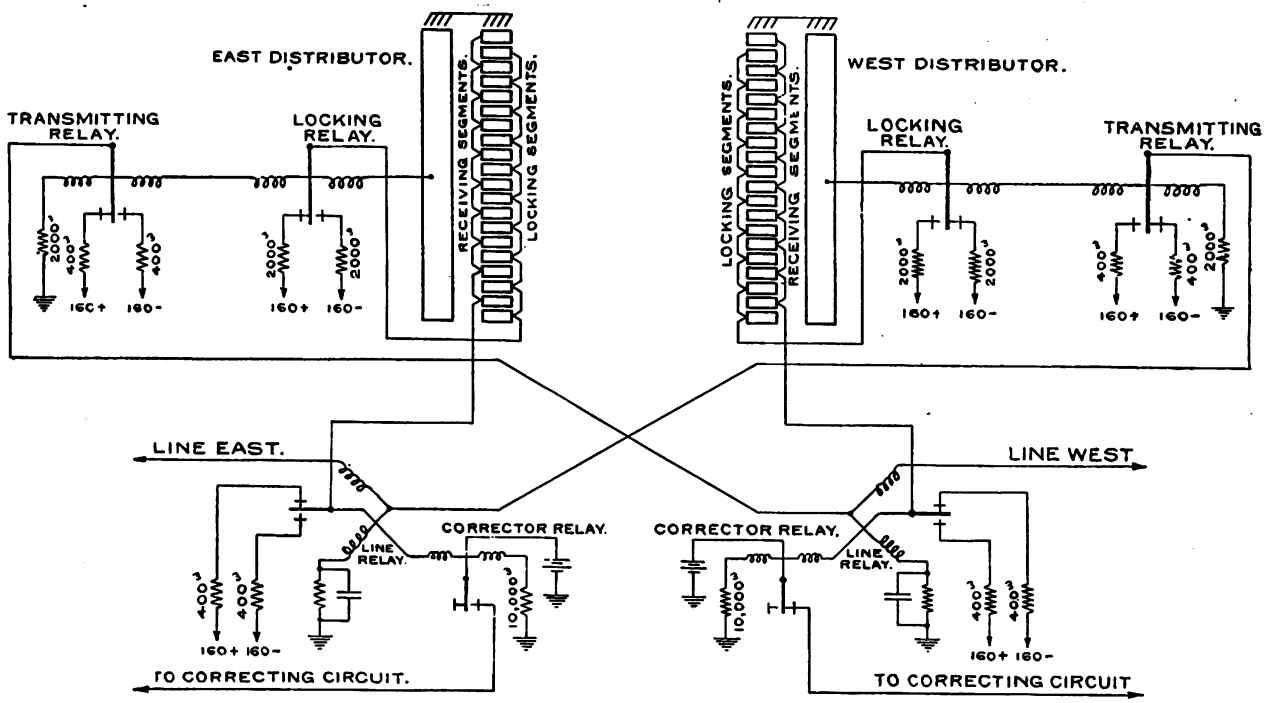

FIG. 218

By referring to Fig. 218 it will be noted that all the segments of the receiving ring of the distributor face plate are connected together and to the tongue of the line relay and that the corresponding solid ring is connected through the coils of the locking and transmitting relay and a resistance to earth. When a signal is received, from the west for example, it is transferred via the tongue of the line relay to the group of short segments electrically connected together but separated from each other by the length of the locking segments. The distributors of the first terminal and repeater station being in synchronism, the receiving brushes complete the circuit through one of the short segments via the solid ring and the locking and transmitting relays. As the tongue of the transmitting relay is connected to the east line and its contents to line battery, the signal is immediately repeated into the east line. As in the case with terminal set reception, the short receiving segment is adjusted to pick up only the middle portion of the received impulse, it is readily seen that potentials are connected to the contacts of the locking relay. As the brush of the receiving ring moves off the short segment upon which the signal was just received, it touches the locking segments and a locking circuit is then formed from the locking battery on the contacts of locking relay via its tongue, the locking segment and the solid ring and thence through the transmitting relay coils. This holds the tongue of the transmitting relay firmly against the contact where it was placed by the signal from the short segment just passed, and in addition to added stability to the repeated signal gives it a duration equivalent to the length of a transmitting segment of the distributor.

In the operation of the multiplex system, a so-called correction impulse is used by the terminal stations for synchronizing and phase finding. This impulse is also made use of by the repeater station for preliminary adjustments which are not required after the initial starting of a circuit, as noted in later paragraphs. The correction impulse from the West

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terminal to which the repeater station synchronizes his West distributor is passed through the repeater to the East terminal, who also synchronizes to it. The same is, of course, true with respect to the operation in the opposite direction.

The correcting segments are all strapped together and connected with the synchronizing unit and mechanical corrector of the distributor in the same manner as on a terminal multiplex set, except that instead of a cam switch to separate the first nineteen segments from the twentieth, this is done by the middle lever of the switch.

Range

At terminal stations the best position of the receiving ring is found by taking the range in each direction on the scale, using the printer as a guide, but there being no printers used in connection with the repeater station another method is provided for this purpose. As stated, however, this adjustment is only required at the initial starting of the rotary repeater. Between the transmitting relay coils and the coils of the locking relay a jack is provided for the insertion of a millammeter. One of the three millammeters on the repeater table is provided with a double conductor cord and plug. To take the range the plug is inserted in this jack, thus placing the millammeter in the coil circuit of the transmitting and locking relays. The range switch is so connected that when thrown to the right it disconnects all of the locking segments from the locking relay tongue and at the same time disconnects all of the group of receiving segments except number 20, and all the correcting segments except number 20. This allows the transmitting and locking relays and the millammeter to receive the correction impulse through the twentieth segment only.

If, now, while the west terminal sends correction, and the repeater is in synchronism with it, the receiving ring is slowly moved in one direction a point will be reached where this meter needle stands quiet. This is one limit. If the ring is moved in the other direction a point will be found where the meter needle again stands quiet. This is the other limit. The ring should be set in the middle of these two limits. The range switch is then thrown to the left, which places all segments normal again.

The multiplex rotary repeater is so wired that it may be used on a quadruple, triple, double or single multiplex circuit by simply placing the proper face plate in position.

According to a weekly paper, wireless enthusiasts in Norway have heard the bag pipes broadcast from Aberdeen (Scotland). It should be pointed out that the proper quarter in which to prefer this complaint is the League of Nations.

Sequoias, the great trees of California, attain a height of 300 feet.

Radio Corporation of America

Harry Chadwick of the Traffic Production Department, New York, is recovering satisfactorily from an operation for appendicitus.

The Christmas Load of Radiograms to Europe in 1923 exceeded all previous performances for the holiday season.

E. N. Pickerill, chief radio operator of the Steamship Leviathan, is vacationing in New York while the big ship is being overhauled at a ship yard.

W. P. S. Hawk of the Honolulu, Hawaii, office is on furlough visiting relatives in Massachusetts.

Lee Lemon, director of traffic production, spent New Year's Day visiting relatives and friends in Baltimore, Md.

Alex E. Reoch, assistant chief engineer, transocean service, was absent a few days in December on account of illness.

All America Cables

Supervisor E. Aracema has been transferred from Iquique, Chile, to Antofagasta, Chile.

Operator Usher has been transferred from Santos to Sao Paulo, Brazil.

Operator R. D. Gardner has been transferred from Guayaquil to Santa Elena, Ecuador.

Operator Jeen has left Balboa, C. Z., for Santa Elena, Ecuador, where he will be stationed.

Negotiations are in progress with every hope of completion for the purchase of the United States and Hayti Cable Company, West Indian System, by the All America Cables.

Say Operator's Mistake Cost Ford South Dakota

Henry Ford was defeated in the South Dakota primary tests because of an error in transmission of a telegram, Ford leaders in Detroit declared recently.

"We will draft Mr. Ford," was the wire William T. Kronberg, secretary of the Ford clubs, says he sent to supporters of the automobile manufacturer in South Dakota.

But he declares the Ford men of Pierre received a wire saying, "We will drop Mr. Ford," and they acted accordingly.

Interesting Telegraph Book

Four hundred commercial and railroad telegraph operators sent in specimens of their penmanship in a contest conducted by a New York magazine. The prize-winning specimens have been published, together with samples of the penmanship of famous old-time telegraphers who were noted for their "copy."

Copies of the handsome library edition of the book "Telegraph Operators' Penmanship" may be procured from Telegraph and Telephone Age for $1.00 per copy.

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EDITORIAL COMMENT

Communication Engineering

So far as the tasks of the inventor and the engineer in improving systems of electric transmission of intelligence are concerned there is a difference in the problems of the "Wire" and the "Wireless" engineer.

In telegraphy and telephony by wire the betterments over a period of twenty-five years have resulted mainly from improvements made in the media extending between the terminal instruments—the line and the cable. The telephone transmitter and receiver, for instance, are today almost identical with what these devices were forty years ago. The quality of transmission thirty-five years ago was as good as it is today. The improvement has been that the distance has increased from say one hundred miles to two thousand miles.

The telegraph has improved in dependability and speed, also mainly as a result of improved line construction and maintenance, increased insulation, and improvements in aerial and underground cables. The Morse Key, the relay the sounder, and the apparatti of Morse multiplex working have changed in construction; not in principle. True the development and extension of printing telegraph systems stands as an advance in terminal apparatus, but much of the success of present day printing telegraph systems is due to betterment in line circuit conditions over those which were available to early printing systems.

It would appear therefore that aside from ingenious mechanical refinements and extensions of terminal plant and organization to care for the growth of telegraph and telephone traffic, that the engineering gains which account for improved transmission have been mainly those involving "line" conditions.

In radio telegraphy and radio telephony, the inventor and the engineer in order to produce systems which will be improvements upon present systems have only the field of terminal apparatus in which to work. The medium connecting transmitting and receiving installations (aside from guided carrier systems) is not likely to be subject to treatment of a sort that would effect the grade of transmission through it of radio signals.

The radio engineer has no choice but to aim to develop terminal apparatus which will render the grade of transmission desired when the intervening medium is in a condition least favorable to the maintenance of dependable operation.

Radio terminal apparatus might be designed to have what could be termed a factor of surplus. Transmitters of given design and given power input embodying this factor might be expected to provide satisfactory service throughout the occasional periods when the least favorable media conditions prevail. Good design might provide that when conditions are favorable or normal the strain upon the factor of Surplus could be reduced permitting immediate economy in operating costs.

The fact that the problems of radio are problems of terminal apparatus only, accounts for the pronounced alterations noticeable, after the passing of a few years, not only in the design but in the principle of radio equipment.

Intelligence in the Delivery Department

THE series of examples of good message delivery which we have for some time been publishing has attracted wide attention.

The Western Union Telegraph Company during recent years has given really constructive consideration to this all important subject. Out of the experiences of Vice-President J. C. Willever and Eastern Division General Manager T. W. Carroll, has come an organized and general attack upon the problems of delivery of telegrams reaching destinations bearing names improperly spelled or incorrect addresses.

It is apparent that many of the errors are chargeable to the tricks of the all-dot letters, c, e, o, r, s, h, p, i and z. Careless or inexpert manipulation of semi-automatic transmitters undoubtedly causes most of this type of mutilation. Transpositions and "wrong keys" in printing telegraph systems contribute their share of the mishaps.

Of course, much of the trouble is traceable to incorrect spelling and to wrong addresses appearing on the original filed copies of telegrams.

While the engineers and operating department supervisors are studying their responsibility in connection with possible remedies, the executives named have enlarged upon the possibilities of deduction and search to the end that delivery clerks are developing a knack of unraveling incorrect addresses so successfully that already the number of occasions when it is necessary to request the sending office to forward correct address is very materially reduced.

Like any other bothersome problem that of Delivery is most successfully remedied when intelligence is applied to its solution.

Telegraph and Telephone Life Insurance Association

ASSESSMENT Nos. 802, 803, 804 and 805 have been levied by the Telegraph and Telephone Life Insurance Association, New York, to meet the claims arising from the deaths of Lewis J. Maxwell, aged fifty-eight years, Jacksonville, Fla.; George L. Perrow, aged sixty-six, St. Louis, Mo.; Carroll T. Sydnor, aged sixty-five, Richmond, Va.; David A. Richardson, aged fifty-seven, Tucson, Ariz.; John E. Smith, aged fifty-one, St. Paul, Minn.; Edmond G. Mason, aged eighty-two, Rome, N. Y.; Edgar A. Smith, aged seventy-four, Somerville, Mass., and John Young, aged eighty-three, Chicago, Ill.

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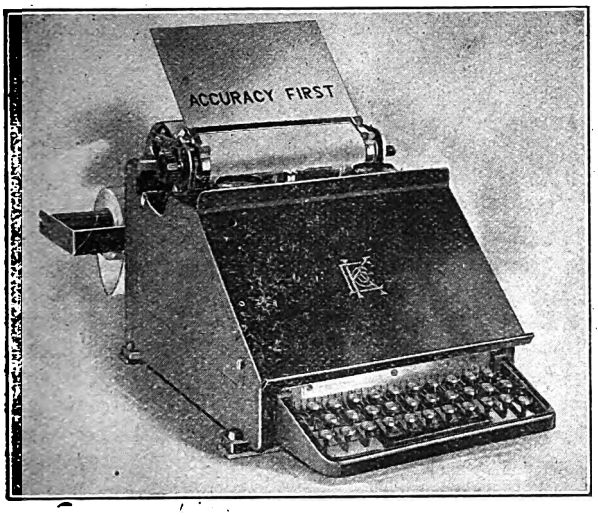
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER



AN ENTIRE SYSTEM
IN
ONE SIMPLE TYPEWRITER UNIT
Not Merely A New Design.
A Revolutionary Change.
The Unit that proves in on lightly loaded circuits.

Kleinschmidt Electric Co.
LONG ISLAND CITY, NEW YORK

HALL SWITCH & SIGNAL CO.

Garwood, N. J. Chicago

MANUFACTURERS OF THE

GILL SELECTOR

THE UNIVERSAL SELECTOR
FOR
TELEGRAPH AND TELEPHONE

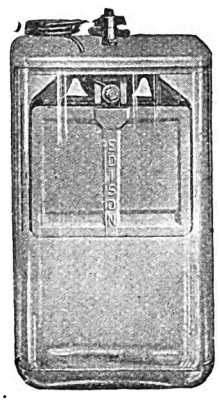
The importance of the telephone and the telegraph is typified in the care that is being taken to manufacture reliable and efficient apparatus. But no matter how well the apparatus is constructed, it is of little value unless the battery supplying the energy is of similar reliability and efficiency, with resultant clear transmission and non-interruption of service.

LOW COST FIGURES

As the cost of inspection and maintenance is made up chiefly of inspectors' or linemen's expenses enroute, the use of a single battery of high capacity, capable of taking care of all functions at a station for a period of two years or more without attention or renewal, brings maintenance figures way down.

CONSTANCY OF VOLTAGE

For telephone and telegraph work four Edison cells having a rated capacity of 200 ampere hours (type 202) or 250 ampere hours each (type 252) are recommended. Both will give full rated capacity, even though in service for years. There is no deterioration on open circuit. In service of this kind, the voltage remains practically constant throughout the entire life of the cells.



EASE OF INSPECTION

Little attention need be paid to Edison cells once they are set up. A patented feature—panels in the lower portions of the zinc—tells the condition of the elements. The first perforations appearing in the panels warn that the elements are approaching exhaustion. Supplied with heat-resisting glass jars, the elements in Edison cells are easy to inspect at all times, even though it is unnecessary to inspect them until they approach exhaustion.

THOMAS A. EDISON, INCORPORATED,

Primary Battery Division, Bloomfield, N. J.

750 People's Gas Bldg., Chicago, Ill.
1205 Hobart Bldg., San Francisco, Cal
2044 Railway Exchange Bldg., St. Louis, Missouri.

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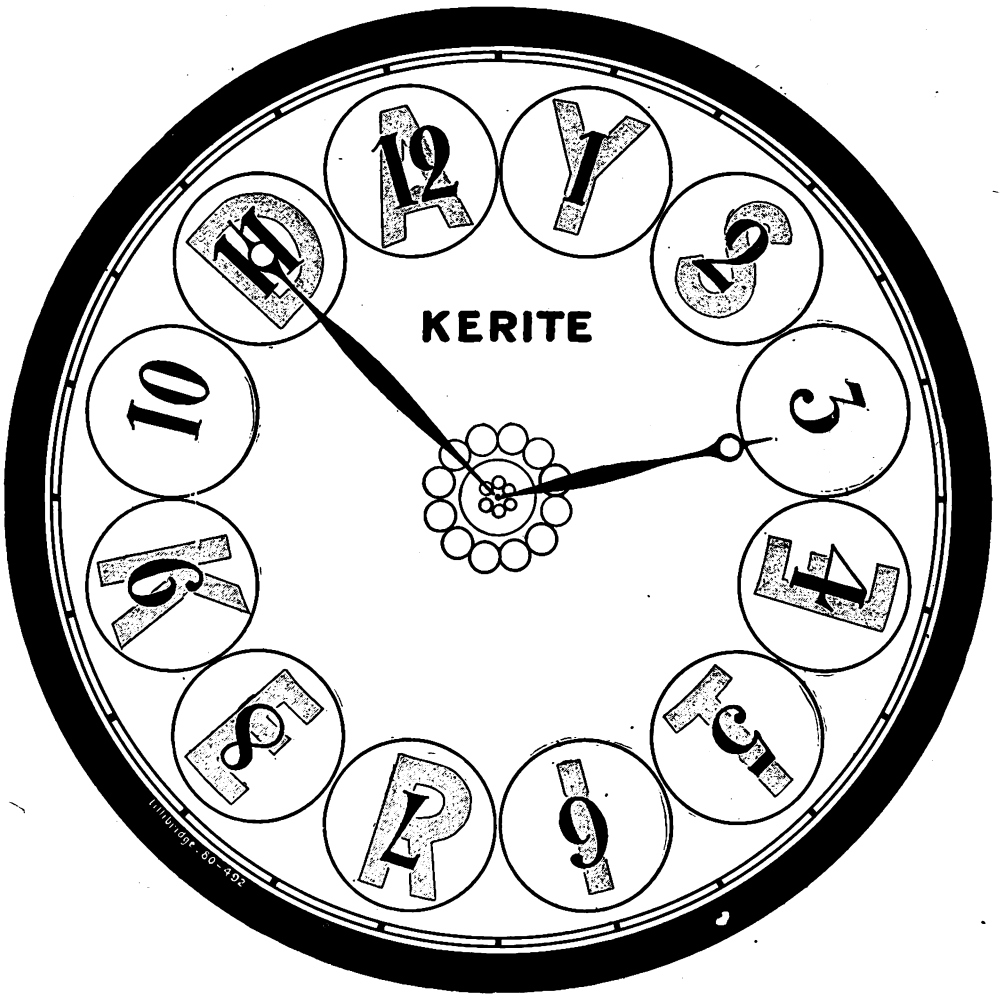

Time is the great test. The most efficient and permanent insulation known is

KERITE

KERITE INSULATED WIRE & CABLE COMPANY

NEW YORK CHICAGO

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

W. A. FAIRBANKS, secretary of the Telegraph and Telephone Section of the American Railway Association, was in Chicago last week on business connected with the railroad service.

A MEETING of Sub-Committee "A-1"—Creosoted Poles and Pole Line Material of Sub Committee "A"—Construction and Maintenance of Pole Lines, Wires and Cables, will be held at 431 South Dearborn Street, Chicago, Ill., on February 5, at 10 A. M.

This meeting is to be held for the purpose of Sub-Committee "A 1" preparing report on subjects assigned to it for presentation at the meeting of Sub-Committee "A"—Construction and Maintenance of Pole Lines, Wires and Cables, to be held on February 6, 7 and 8.

IN accordance with the action taken at its last session, a meeting of Sub-Committee "J"—Circuits and Current Supply will be held in New York, on Tuesday and Wednesday, February 5 and 6. The first day's session will convene at 10:00 A. M.

A meeting of the Special Committee on Circuits will be held in New York City, on Thursday and Friday, February 7 and 8.

A MEETING of Committee No. 11—Telegraph and Telephone Transmission of the Telegraph and Telephone Section will be held at 30 Vesey Street, New York City, on Tuesday and Wednesday, January 22 and 23.

Long Service

THE following letter reaches us from one of our agents:

J. B. T. Here's an item worthy of note.

Michael Nelis of Sacramento, Calif., has been in the employ of the Western Union Telegraph Company, at Sacramento for fifty-two years, and in the same building during all that time.

While the operating room has been moved up town, the test and repeater station remains in the old office on Second Street, where Mike has been doing his continuous performance for fifty-two years, with the exception of one month during the unpleasantness of 1883. If this is not a record performance, lets hear from anyone who can beat it.

There were 10 of us who "went out" in 83, at Sacramento, of whom five are still living.

—o—

THE Philadelphia Local Telegraph Company, which maintains the Ticker Service in Philadelphia, has moved from 250 Chestnut Street to 230 South 11th Street, room 106, Telephone 2020.

All complaints, communications and service calls should be sent to the new address.

—o—

Radio Stations

THE Danish Government has decided upon the construction of radio stations in Greenland. They will be situated at Godhaven, on Disko Island; Godthaab, on the west coast of Greenland; Julianehaab, on the south coast; and the Angmagssauk on the east coast.

Morkrum Apparatus is built to run with minimum attention.

This is amply proved by the records of operation in places far from the watchful eye of the skilled printer mechanic.

Donald Murray, the well known English Printing Telegraph authority writes regarding two Teletypes in use by the Yokohama Specie Bank:

"These two machines have been in operation for over a year and not a single part has been replaced."

Such performances easily explain why Morkrum Printers are used the world over.

THE SUN NEVER SETS ON MORKRUM PRINTERS

MORKRUM COMPANY

CHICAGO
1410 Wrightwood Avenue

NEW YORK
World Building

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THE MORKRUM "TELETYPE"

THE installation of printing telegraphs on the main routes in the British telegraph service, principally in the form of multiplex systems, has been proceeding steadily during the past few years, and practically all the larger centres are now so interconnected.

Multiplex systems, by affording 4, 5 and 6 duplex channels on a single wire, are essentially line-saving, and by their use on long-distance circuits appreciable economies in wire costs have been possible. On short routes, however, where maximum loads average between 800 and 1,000 telegrams daily, the advantages of multiplex are not so fully realizable, and the advent of a simpler form of printing telegraph has, for some time, been awaited. Prior to the war a promising instrument was designed by Mr. H. H. Harrison, the well-known authority on machine telegraph mechanisms, but prohibitive manufacturing costs have arrested its development. The appearance in this country two years ago of the "Teletype," manufactured by the Morkrum Company, Chicago, was therefore a matter of interest, and, as its performance and construction were favorably reported upon, the British Post Office took an early opportunity of subjecting the apparatus to a trial on public wires. Promising results were obtained, and the number of circuits being equipped with "Teletype" apparatus is increasing. It may therefore be of interest generally to offer a brief description of the principal features of the instrument.

The "Teletype" belongs to that group of printing telegraphs described somewhat lengthily as "single-channel start-stop" systems. A five unit alphabet is employed, but the mechanism equivalent to the multiplex sending and receiving distributor does not rotate continuously and the transmission of each five-unit combination is preceded by a "start" signal and is followed by a "stop" signal, making virtually, a seven-unit system.

In size and its shape resembles the ordinary commercial typewriter, and it may be mentioned that the table space required for duplex working is simular to that provided for Morse duplex working. The instrument consists of a typewriter keyboard in front, a small transmitting mechanism at the right, a motor with a centrifugal flywheel governor to keep the speed reasonably uniform, and a printing unit, in front of which is positioned the typewheel and the tape on which the message is printed.

The keyboard consists of three banks of keys, and, in the Post Office sets, two space bars, "letter space" and "figure space". The keyboard layout follows universal typewriter practice, and arrangements are being made to bring it into conformity with the Post Office standard keyboard as regards the position ot "secondaries" or auxiliary characters. The "letter space" bar is used to space before or between words, the "figure space" bar being brought into use to space before or between figures. By this means separate inversion signals are unnecessary the space-bar signals performing the double function of spacing, and of changing the printer typewheel position from letters to figures, or *vice versa*.

Underneath the keyboard lie five irregularly-notched levers, and depression of a key slides one or more of these levers to the right or left thus forming the desired permutation. The levers moved to the right lock corresponding contact levers of the transmitter unit, leaving the others free. Simultaneously, clutch mechanism brings into operation the drive from the motor, and a series of cams with staggered notches revolve, permitting the unlocked contact levers to close and open the circuit successively like playing successive notes on a piano; the locked levers being held open throughout. "Start" and "stop" signals transmitted from a sixth contact lever precede and follow the letter permutation. Immediately the "stop" signal is sent the clutch mechanism disengages and the transmitter unit comes to rest until another key is depressed.

The receiving unit is a combination of Hughes reception and Baudot printing. Incoming signals actuate a single electro-magnet and the movements of the armature of this electro-magnet are distributed to a group of five selector levers by an ingenious shuttle roller the action of which merits description. The shuttle roller is keyed to the printer shaft and on receipt of a "start" signal, rolls round the face of a cam-ring. On the face of this ring are five indents with a selector pin projecting at the base of each indent. The shuttle roller, when free, rides into each indent and pushes the pin forward, but it is arranged that when the electro-magnet armature moves upwards, an extension prevents the movement of the roller into the indent over which it may be travelling at the moment, and the pin in that indent remains undisturbed. Thus, as the armature responds to incoming current reversals so the shuttle roller, in completing a revolution pressing against the cam-ring face, is either free to roll into an indent, or is intercepted, according to the position of the armature. When a selector pin is set, the movement is carried mechanically through a selector lever and plunger to a seeker which rests on a combiner wheel as in the Baudot receiver. There are five such seekers similarly operated, and when the permutation, which is set during a revolution of the shuttle roller, finds the appropriate group of notches on the "combiner," the print arm is released and the tape is thrown against the revolving typewheel, thus printing the selected character. On receipt of the "stop" signal, the clutch mechanism is disengaged and the printing shaft carrying typewheel, etc., stops when it has completed one revolution.

From the foregoing brief outline it may be apparent that the transmitter and printer units must rotate at approximately uniform speeds in the interval betwen the "start" and "stop" signals. This uniformity of speed is obtained and maintained by means of the centrifugal governor in the fiywheel of the continuously running motor. Governor contacts are brought out on a flexible arm. Speeds are verified by watching the movement of alternate black and

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white bands painted on the periphery of the flywheel through slotted extensions of a vibrating tuning fork. If the bands appear to be stationary, the motor speed is correct, but visual movement of the bands in one direction or the other indicates speed fast or slow and corresponding adjustments are made simply by turning the governor arm contact screw to the right or left. A comparatively wide variation is permissible, as the start-stop principle affords letter correction.

The "Teletype" is arranged to run normally at 40 words (240 letters) a minute. The keyboard is "free" to be manipulated at any speed up to that figure without consideration having to be given to cadence signals or time intervals, but keys struck quicker than maximum speed resist depression as the previous permutation of selector bars remains locked until transmission of that letter is completed. Higher speeds may appear to be desirable with a type keyboard printing system, but in practice it is found that the number of telegrams which can be signalled at the present speed keeps the receiving operator fully employed gumming and checking, and any increase in load which might be carried with an increased signalling speed would probably necessitate additional staff at the receiving point without commensurate advantage. Working at a steady rate of 40 words a minute, experienced "touch" keyboard operators possess a reserve or margin of skill which expresses itself in rythmic and accurate manipulation with a minimum of effort and in operating the "Teletype" those features have been particularly noticeable.

The first Post Office circuit to be equipped with "Teletype" was that between the Central Telegraph Office and Croydon, a distance of about 13 miles in length. Initially the circuit was worked simplex, batches of five messages being sent in either direction. A "home" record was made as outgoing signals passed out to line through the local printing electro-magnet. Results proved sufficiently promising to warrant a further step being taken and arrangements were made to duplex the instrument by severing the connection between the transmitter unit and local printer electro-magnet, abolishing the "home" record. Duplex "Teletype" is now worked on seven Post Office circuits, varying from 2 miles to 50 miles in length and carrying from 500 to 1,000 telegrams daily. The best effort so far has been the excellent total of 950 telegrams transmitted over the London—Margate circuit between 9 a. m. and 5 p. m. on the Saturday preceding August Bank Holiday.

It would be unwise at present to express a definite opinion regarding the maintenance of the apparatus. Modern machine telegraph designers aim at producing simple machines with as few electrical contacts as possible, and it can be said that the "Teletype" approaches the ideal in this respect. But the introduction of a machine telegraph, even of comparatively simple construction, at an office where formerly the entire mechanism for telegraphy consisted of Morse keys, sounders, and, perhaps, relays, creates conditions which are not too favorable to first-class maintenance, and time must elapse before manipulative and engineering staffs become acquainted with the new apparatus. Despite this fact most of the Post Office "Teletype" circuits are working with surprisingly few stoppages, and in some cases stability is maintained over long periods of weeks.

Although in the evolution of machine printing telegraphs the extreme simplicity and stability of the Morse sounder have not been attained, a long way has been travelled towards it. The "Teletype" is a notable landmark, and its success leads one to anticipate within the next few years a rapid extension of start-stop telegraph systems in this and other countries.—*Telegraph and Telephone Journal.*

To Telegraph Employees

WILL YOU DO A FAVOR FOR YOUR BEST FRIEND?

Will you do this if it costs you nothing but will help yourself? If so read the following and act on it.

The more members we have the larger the share of our earnings to be distributed in dividends to the members. The reason is that the ratio of cost of management decreases as the savings of the members increase.

Instalment shares now earn 6% dividends as against 5% four years ago.

Dividends are now computed and compounded quarterly. These are some of the benefits you are enjoying from increased membership.

National Thrift Week begins January 17. Let each member bring in one or more of his intimate friends and induce him to join. Show him our literature and safety of our plan.

In this way you will help your friends and yourself. Remember—this is a co-operative Institution and is successful only because the members made it so.

Do your share now to make a bigger Institution and both you and your friends will profit by it.

Remember—and act—January 17, the biggest week we have ever experienced.

Please bring in one or more of your friends.

If you wish us to send literature to one of your friends, please furnish us the name and address

SERIAL BUILDING LOAN AND SAVINGS INSTITUTION.

EDWIN F. HOWELL, JR.
Secretary-Manager.

Electrical Aid Society of Philadelphia

THE Thirty-Sixth annual meeting of the Electrical Aid Society of Philadelphia was held on January 15th at Mosebach's, 1239 West Girard Avenue, Philadelphia. Refreshments were served and dancing was indulged in.

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POSTAL TELEGRAPH-CABLE COMPANY

W. P. BROWN, superintendent, third district, Metropolitan Division has been transferred to the office of Vice President E. P. Tully, as his assistant, in direct charge of cable solicitation.

J. Sheffrey, for some time in charge of the telephone department, at the main office, 253 Broadway, has been appointed superintendent, third district, Metropolitan Division, to succeed W. P. Brown. Mr. Sheffrey is succeeded by Miss A. Cusack, who has for some time been in charge of the credit department in the auditor's office.

C. R. Rimpo, has been appointed assistant treasurer in charge of money transfer service. Mr. Rimpo has been for many years connected with J. J. Cardona's department and has completed twenty-five years in the service.

J. Nering, for many years manager of the Chicago city office, has been made superintendent, the city being divided into four districts, each district under a district manager.

Max Bachmann, who has been for a long time in charge of the call circuit and delivery departments at the main office, and as such has been a banner winner on several occasions, has been appointed manager of the first district. He will continue to be in charge of the main office district.

G. J. Stilson, for many years assistant manager at Chicago, has been made district manager of the second district, with headquarters at the Continental Commercial National Bank Building.

Harry C. Brolin has been appointed manager of the third district, embracing the north and westside branches with headquarters for the present at 620 Orleans Street. Permanent headquarters will later be opened in the Rigley Building.

Harold E. Grey, has been appointed district manager of the fourth district, with headquarters at the Union Stock Yards. He will have charge of the southside offices. Mr. Grey was formerly supervisor of the north and westside branches.

THE annual meeting and election of officers of the Magnetic Club will be held on Thursday, January 17.

The reception and mailing rooms on the tenth floor of 253 Broadway, have recently undergone extensive alterations. Mahogany has taken the place of the oak furniture.

New York City

NEIL FLOOD, assistant to Mr. Wallace of Manager C. A. Coney's staff, has been confined to his home for several weeks, suffering from an attack of the grippe.

John Ulla, assistant general traffic chief, was severely injured when a motorcycle in which he was riding skidded. Beside a sprained ankle he had a narrow escape from being hit by a trolley car.

Miss Evelyn Wineburgh, of the Utica, N. Y. office, was a recent visitor.

Mrs. Jennie Loblein, operator, has resigned.

Mrs. May Conklin, operator in City Three, was the victim of a robbery committed recently while she was going home from work. The thug grabbed her pocketbook and escaped before she could summon a policeman. Mrs. Conklin lost her commutation railroad ticket, besides a considerable sum of money.

Managers Appointed

MISS ZELLA E. ADAMSON, Cocoa, Fla.; C. Benford, Arcadia, Fla.; A. B. Collier, Joplin, Mo.; C. P. Derryberry, Atchison, Kans.; W. E. Ogle, Rock Springs, Wyo.; Miss E. Brennan, Princeton, N. J.; M. J. Burrows, Traverse City, Mich.; R. I. Mitchell, Owosso, Mich.; L. O. Mackison, Quincy, Ill.; F. P. McQuality, Murphysboro, Ill.; D. A. Keffer, Vero, Fla.; Esdra Huchet, Belton, S. C.

Commercial Cable Company

HENRY F. HARRINGTON of San Diego, Calif., who retired from the service of the Commercial Pacific Cable Company, desires to thank his late associates for the radio set presented to him to cheer him in his unfortunate condition of physical disability.

Rum Schooner is Blamed for Broken Cable

THAT the crew of the alleged rum-running schooner Prince Albert cut the Pacific cable twenty-five miles from San Francisco, entailing a loss of $100,000 to the Postal Telegraph Cable Company, is the belief of Company officials, who, on November 27th offered a reward of $1,000 for evidence leading to the apprehension of the guilty persons. As soon as the cable repair ship Restorer appeared on the scene to splice the broken cable, the Prince Albert raised anchor and left hastily for the north. It is now presumed to be in Vancouver.

"Besides having the cable out of commission for several days, entailing a large loss of revenue, the Restorer was obliged to speed at forced draft all the way from Honolulu to San Francisco to pick up the broken cable," said Captain V. F. Sparks of the repair ship. "Sailing at top speed is expensive. The break in the cable was about fifteen miles west of Montana. When the Restorer reached the spot the Prince Albert was anchored close by. After it saw night lights, which showed we were repairing the cable, the Prince Albert left the vicinity suddenly.

"The cable had been cut in two with an ax. It is probable that the vessel's anchor caught on the cable, and when raised to the surface made a heavy weight. Rather than take the trouble to disentangle the anchor from the cable, the rum runners presumably chopped the latter in two with an ax.

"The break was in 300 feet of water, where no vessel but a rum runner would anchor. The law on wanton destruction such as this outside of territorial waters is not clear, but we will endeavor to have some precedent established. The same 'accident' might occur again and again if rum runners are going to continue anchoring in this vicinity." *San Francisco Chronicle.*

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WESTERN UNION TELEGRAPH CO.

The Western Union business car containing Newcomb Carlton, president; G. M. Yorke, vice-president in charge of engineering; J. C. Willever, vice-president in charge of commercial; J. J. Welch, vice-president in charge of traffic; W. C. Titley, vice-president in charge of plant, and William Murray, secretary to the party, left New York on January 10th for an extended trip to the Pacific Coast. Stops will be made at Harrisburg, Pittsburgh, Salt Lake, Spokane, Seattle, San Francisco, Los Angeles, Phoenix, Amarillo, Wichita and Chicago where inspections will be made of the company's property.

W. C. Titley and J. J. Welch on January 1st were made vice-presidents and the former is known as vice-president in charge of plant, and J. J. Welch, vice-president in charge of traffic.

R. L. Jones of the New York executive office is in Chicago in connection with the opening of the new cable.

G. E. Palmer, circuit layout and routing engineer, is on a six months' furlough. C. W. Fry is acting in his place with W. E. Bellman relieving Mr. Fry.

THE Western Union Telegraph Company is extending one of its cables from New York to Chicago, which gives Chicago direct cable communication with London, England. It will be a land line from New York to Chicago, made possible by the development of the new Rotary Repeaters. The cable was formerly opened on January 7th, the Mayor of Chicago congratulating the Lord Mayor of London.

Ledbetter-Edwards Wedding

A VERY pretty marriage ceremony took place on Christmas eve last in the Community Church, Brooklyn, N. Y., when Miss Mary Anne Edwards, daughter of J. P. Edwards of the Western Union Telegraph Company, New York, was married to E. R. Ledbetter of Oklahoma City, Okla.

The best man was John Ledbetter of New Orleans, brother of the bridegroom, and the ushers: T. M. Haston, Sanford Treat, Eaings Willcox and Myron Stewart.

The young people will be at home in Oklahoma City, after January 15.

Clever Delivery Service

THE Western Union Telegraph Company makes it a point to deliver a message in any city to which it is addressed if the party lives within the city limits. The following experiences are sent us by local officials of that company for publication to show the resourcefulness of the messenger boys when they are sent out with a message to be delivered:

St. Paul, Minn.:

Susie Walker, 609 Cornell St., not listed, delivered to 696 Carroll Ave.

Shores McIntyre, 221 Concord, delivered to Geo. McIntyre, 515 Concord.

Omaha, Neb.:

"Message received for W. L. Howland, 3725 Hamilton St., received Aug. 14, was sent out by boy who reported no such number. Party not listed City Directory or 'phone book. No such number listed on Hamilton St. Message serviced on by two other clerks. When I saw message I tried 2537 Hamilton. Mrs. Howland answered 'phone. I read it to her and she requested it 'phoned to Mr. Howland at Grand Union Tea Co. I called Mr. Howland, read it to him and received an answer over the 'phone."

Des Moines, Iowa:

"Earl Marston, messenger No. 27, Des Moines, Iowa, believes in the plan of 'follow through,' when he once gets on the trail he shows the spirit that wins. On August 15 he was given a very important message addressed to Mrs. Eva Forret, 1421 Lincoln St. He scratched his head and said that should be Linden St., and immediately tried 1421 Linden, but found no such number. Undaunted he says 'I'll try 1521 Linden,' and sure enough that was what was intended by the sender, but the lady had moved to 1515 High St. A trial at that number developed the fact that she had again moved, but where to was unknown. Did Earl beat it for the office to report 'unknown.' Not he. He used his head for something else than to hold his collar down, and made inquiry next door to where the lady formerly lived and learned she was at the house on the corner of 14th and High St. He made his delivery and returned to the office with a big smile and the happy feeling that he had performed a splendid service. He had, and also shown himself to be a boy that could be depended upon and one that is marked for future promotion."

Considerable effort has been expended by the St. Cloud and Madison, S. Dak., offices in identifying the correct addresses of messages with incomplete and incorrect addresses.

Kansas City, Mo.:

"Ingenuity and resourcefulness on part of service clerks Tom Smith and Frank Mills enabled us to effect deliveries without resorting to service messages on the following messages received with bulled addresses:

Message was recd. addssd. to:	*Delivered to*:
Witten Gin Company	Witte Engine Co.
P. R. Wright Mtr. Co.	R. P. Rice Motor Co.
Nat'l Coal & Supply Co.	Nat'l Clk. & Suit Co.
Cook Tank Co.	Cook Paint Co.
Clifton Hospital	Christian Hospital
200 Japes Bldg.	200 Gates Bldg.
5825 Gyster St.	5825 Lister St.
Bethany Furn. Co.	Abernathy Furn. Co.
Votte Co.	Noggle Co.
W. F. Mellaven	W. T. Trelavan
3304 Aslure	3304 Askew
J. R. L., W. U. Office	J. R. L. Wulff
Howard Mfg. Co.	Melmer Mfg. Co.
General Bldg.	Gumbel Bldg.
Baird Co.	Barrett Co.
Carl Earl Com. Co.	Carlisle Com. Co.
West Side Paper Co.	Waxide Paper Co.

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Henry Barber Co.....Henry Lorber Co.
White Star Paper Co.....Waxide Paper Co.
2509 Haviland .....2509 Highland
1035 McAllester St.....1035 McAlpine St.
A. W. Pipe & Fdy. Co.....Mmn. Type & Fdy Co.

Trans-Pacific Tests

EAGERNESS for the establishment of direct wireless communication from Vancouver, B. C., to Great Britain has been whetted by reports that the Pacific Cable Board have been conducting experiments, during last summer, in Trans-Pacific wireless. It is surmised that these experiments have some connection with the delay in the negotiations between the British Government and the Marconi Company, which has hampered the company in erecting a great station in British Columbia, for which the site is already secured.

It is understood that exhaustive tests have been carried out by Commander E. C. Watson, representing the Pacific Cable Board, and the British Post Office, from the coast of British Columbia to Australia, via Fanning Island, with such success that an extension of the scheme is likely to include China and South Africa. Commander Watson's plans have been kept secret and the tests have been conducted at isolated points along the coast.

Canadian National Telegraphs

EFFECTIVE January 1st, the following changes have been made in the executives and other offices of the Canadian National Telegraphs:

Chas. E. Davies, general traffic superintendent, Toronto appointed assistant general manager, Toronto, in charge of electrical engineering, plant and railway service. Following the sudden death of G. C. Jones, general manager, on December 31st, Mr. Davies was appointed acting general manager, in addition to occupying the position of assistant general manager.

W. G. Barber, general commercial superintendent, Toronto appointed general superintendent, Toronto, in charge of commercial and traffic matters.

J. Sullivan, district commercial superintendent, Winnipeg appointed commercial supervisor, Western lines, Winnipeg.

J. G. Davies, district commercial superintendent, Toronto transferred to Winnipeg as manager of the Winnipeg office and superintendent of the district, vice J. Sullivan.

C. W. Dawzy, manager, Toronto, appointed superintendent, Toronto, with jurisdiction Kingston—Cochrane and West to Port Arthur and Superior Jct. in Ontario, vice J. G. Davies.

G. H. Walters, district traffic superintendent, Montreal appointed manager at Toronto, vice C. W. Dawzy.

E. Kenward, superintendent of railway service, Toronto, appointed district plant superintendent, Toronto, in charge of outside plant, Eastern Lines, vice W. J. Duckworth, assigned to other duties.

A. P. Linnell, traffic supervisor, telegraph and telephone department, Canadian National Railways, Montreal, appointed superintendent of railway service, Eastern Lines, Toronto, vice E. Kenward.

Geo. T. Trowhill, supervisor of wire service, Toronto, appointed general plant supervisor in the office of the assistant general manager, Toronto.

R. C. Barker, supervisor of automatics, Toronto, appointed supervisor of inside plant, in the office of the general superintendent, Toronto.

The funeral of G. C. Jones, late general manager of the telegraph and telephone department of the Canadian National Railway, including the Canadian National Telegraphs, who died suddenly on December 31st, 1923, was held on the afternoon of January 3rd, from the residence of J. B. McCarter 56 Chestnut Park Road, Toronto.

The service was a striking tribute to the sterling worth and the esteem in which the late Mr. Jones was held by men in all walks of life, and was attended by prominent officials of both the Canadian National and Canadian Pacific Railways, as well as men noted in financial and commercial circles in the country. A large number of associates and employees of the Canadian National Telegraphs were present to pay their last mark of respect to the memory of their departed general manager.

The funeral service was conducted by Rev. W. A. Cameron, Pastor of Bloor Street Baptist Church and was marked by simplicity and the genuine sorrow evinced by the large number of friends and former business associates present. The Pallbearers were:—Col. Noel Marshall, President of the Standard Fuel Company; W. D. Robb, Vice President Canadian National Railways; A. C. McConnell, Canadian National Telegraphs; Geo. T. Bell, W. Gillen, Canadian National Railways; and T. McGregor. Interment took place at Mount Pleasant Cemetery, Toronto.

The floral tributes were unusually large and beautiful, and were received from points all over Canada. Every district of the Canadian National Telegraphs was represented as well as special wreaths from officers throughout the system. Many floral tributes were also received from the numerous friends and business associates of the late Mr. Jones.

During the short term of office held by Mr. Jones with the Canadian National Telegraphs, he had become endeared to the hearts of officials and employees, and his loss is deeply felt by all. Heartfelt sympathy is extended to Mrs. Jones in her sad bereavement.

W. C. DAVIET, vice-president, Postal Telegraph-Cable Company, New York, writes: "In renewing my subscription, I wish to say that the 'Age' is always a welcome sight and its articles perused with interest. You have my best wishes for the coming year for both the paper and its editor."

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OBITUARY

GEORGE CLAPPERTON, vice president and traffic manager and a director of the Commercial Cable Company, died at St. Lukes Hospital on January 11th as the result of an operation for appendicitis.

Mr. Clapperton was born in 1854 at Ercall Magna, Shropshire, England, but was a naturalized American Citizen, and had been connected with the telegraph business since 1868.

He was sent to America by the Direct United States Cable Company in 1874 and was an operator in its service until 1882. From 1882 to 1884 he was in the employ of the Western Union Telegraph Company at Canso, Nova Scotia.

He first entered the service of the Commercial Cable Company on April 16th, 1884, as superintendent at New York.

His rise to the position of first vice-president during the succeeding years was due to his practical and varied experience in the field of telegraphy as well as to his business acumen. He was distinguished for his devotion to duty during the forty years of his connection with the Commercial Cable Company.

His death will be felt keenly by his associates to whom his sterling qualities, helpful cooperation, and friendship had endeared him.

Mr. Clapperton was a member of the Chamber of Commerce of New York, The Pilgrims Society, Saint George's Society, Saint Andrew's Society, Saint Andrew's Golf Club, the Engineer's Club, the Blooming Grove Hunting and Fishing Club, and the Hardware Club. He was also a Trustee of The Mackay Companies, and a Director of the Postal Telegraph-Cable Company.

The funeral took place at 10:30 a. m. from St. Matthews Church, West 84th Street, New York, on January 14th. Interment was at Woodlawn Cemetery.

J. S. W. PHILLIPS, aged sixty-four years, died on December 27th at Lumberville, Pa., at the residence of his daughter. Mr. Phillips was educated at Phillips' School, New Hope and Chamberlain's Academy, Somerville, N. J. He studied telegraphy at New Hope and was an expert operator, right of way man and inspector for the Western Union Telegraph Company for over fifty years, retiring because of ill health four years ago.

He was a member of the Association of Western Union Employees, Old Time Telegraphers' and Historical Association, Dot and Dash Club, Electrical Aid Society, Bucks County Historical Society and Amwell Lodge, F. and A. M. He was long an active member of the Franklin Institute of Philadelphia. Funeral services were held on December 30th by the Masonic Order. Interment was in the family plot in the Old Cemetery, Somerville, N. J.

ANDREW S. WEIR, aged fifty-eight years, of Philadelphia, Pa., widely known telegraph man in financial circles, died in Atlantic City, N. J., on New Year's Eve. Interment was at Ardsley Burial Park.

Mr. Weir was for many years prominent in telegraph circles, being president of the Electrical Aid Society and of the Dot and Dash Club of Philadelphia. He is survived by his wife and one daughter.

WILLIAM DOUD PACKARD, aged sixty-three years, of Warren, Ohio, one of the promoters of the Packard car, died on November 11th, at his home in that city.

A Military Telegrapher in the Civil War

THE following has been taken from the diary of Judge H. K. Weard, now dead, of Norristown, Pa., Captain Company H, 15th Pennsylvania Cavalry:—

There had been assigned to the brigade a young telegraph operator, John J. Wickham, who, when opportunity offered, rendered valuable assistance. Before reaching Christiansburg, Va., we had learned that the office of the telegraph company was in a freight car at the farther end of the town, and a small detachment under Lieut. C. S. Hinchman was sent ahead with Wickham to capture it and learn what he could of the movements of the enemy from the dispatches he could gather in.

Making their way around the town in the evening they reached the car without being discovered and captured the operator at his instrument. Wickham, began "calling" Lynchburg, but realizing that the operator there would know that a stranger was at the key he forced the Christiansburg operator to do the wire work. He asked Lynchburg if they had any news about the Yankees, and kept up the conversation for sometime, until a pointed question by Wickham about the rebel forces aroused the suspicion of the Lynchburg operator, who said: "I believe I'm talking to the Yankees now."

Wickham then took the key and told him truthfully who he was, and at that the Lynchburg man let out with all the "cuss words" he had in stock, and even these could not express his feelings at having given any information to the enemy; and especially was his blasphemy heaped on the poor operator. But, here Wickham stopped him and told him that he should not blame the Christianburg man, as a fellow with a pistol at his head is apt to say just what the fellow who holds the pistol wants him to say.

The operator at Christiansburg thanked Wickham for making this explanation as it would put him right with his associates in the rebel service.

Wickham was a strenuous youth in those days, and continued to make his mark, so that when he died he occupied the position of a Judge in the Superior Court of Pennsylvania.

Old Story

Wife—How many fish was it you caught on Saturday, George?

Husband—Six, darling—all beauties.

Wife—I thought so. That fish market has made a mistake again. They've charged us for eight.

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Still Holds Her Secret

EVERYONE has noticed a troubled look on the face of "Old Farmer" Lawton ever since he and Mrs. Lawton returned from their late Western trip. When asked what was on his mind the "Old Farmer" without his usual smile merely said, "Oh, nothing, simply on my good behavior and sawing up my winter's wood supply." But this did not satisfy the Scribe reporter, who is ever on the lookout for good live news so we put our telepathy powers to work and this is what is brought out.

It seems that among other places of interest that the Lawtons visited was the Jiccarillo Apache Indian reservation in New Mexico during their annual Fiestas which included a week's feasting and dancing.

The familiar sound of the tomtom and other weird sounding musical instruments revived sweet memories of half a century ago when the "Old Farmer" was much younger and frequently attended and took part in the Indian's annual festivities. Forgetting his rheumatic limbs and wishing to demonstrate to Mrs. Lawton that he was still young and frisky he was soon hopping around that bonfire with the same activity that many of the redskins themselves displayed, after which he joined his own wife on the smooth side of a cactus bush that they had been utilizing as a seat but before she could comment upon her husband's nimble movements two Apache bucks, seemingly eight feet tall, came up and demanded that the "Old Farmer" give them fifty cents each for the privilege of dancing with their greasy old squaws. Of course he complied and after one of her hearty laughs Mrs. Lawton solemnly promised that she would never, no never, tell anyone how her illustrious hubby had been buncoed by the Apaches, that is, as long as he would be real good and wipe the dishes for her on their return home, hence his troubled look and remark that he is on his good behavior.

With this great secret locked up so tightly between them we feared we would hear nothing of this Western trip, but editors frequently have to resort to even more than human telepathy in order to secure a good piece of news.

If the present bad weather continues much longer so that the farmers cannot gather their corn crop and their good wives bring news items into us it's not unlikely we will have to go out and murder some of our good citizens in order to fill up the valuable columns of this paper.

P. S.—Mrs. Lawton has finally consented to an interview and says she would like to tell our readers how much the "Old Farmer" thinks of her. "You see," said she, "one day when we were sitting on the rear end of an observation car taking in the Cliff Dwellers ruins in southwestern Colorado, as the little narrow gauge train whizzed around the many sharp curves at an altitude of about eleven thousand feet he clung to me with the tenacity of a young mother with her first born. The conductor remarked that he must love me most dearly, to which he replied: "Not zactly that conductor, but she is the best cook in the state of Illinois and I would not care to see her take a tumble of a couple of thousand feet and land in the top of one of those 200 feet pine trees where I might not be able to extract her."—*County Scribe,* Plymouth, Ill.

By WIX

"Lepadotemachoselachogaleakraniokatakechumupotrim," according to an item in "The Philosopher of Folly," a column in the Cleveland *Plain Dealer* by Ted Robinson, is the longest word known in any language. It is, so the item says, a Greek word. After explaining about several other long words the story goes that "Kamakauaokawenauloaklani" is the name of a little Hawaiian girl.

As each of these words has "ok" in it telegraph operators would probably be willing to say OK and let the rest go. I suggest the following song might help third trick operators in lonely towers to pass away the time:

My Kamakauaokawenauloaklani
(Tune: Day Letter Blues)

Each night on this lone trick,
In this tower of stone and brick,
I think of you, Kamakauaokawenauloaklani.

As the limited goes thundering by
For you, my dear, I sigh,
And long for you, Kamakauaokawenauloaklani

By and by when I eat
I think of you so sweet,
Sweetest of all, my Kamakauaokawenauloaklani

CHORUS:

Though your name may be long,
'Tis the theme of my song
As I work for the company,
And sing of you, my Kamakauaokawenauloaklani.

CHARLES E. BAGLEY, district superintendent, Postal Telegraph-Cable Company, Philadelphia, Pa., writes: "It is with a great deal of pleasure that I forward my remittance for 1924 to the 'Age.' It hardly seems possible that forty years have passed since you issued the first number in June, 1883. I have never missed a number since the start and still look forward with keen interest to receipt of each new number of the 'Age.'"

EVERY MAN AND WOMAN SHOULD READ
CONSCIENCE AND SUCCESS
By
Fernand E. d' Humy

This little book will greatly benefit every reader. Its simple lessons will show you how to make your life a happy, wholesome, successful one. You will become surrounded by loving friends and you will delight in doing for others.

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TELEGRAPH & TELEPHONE AGE

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AN INTERESTING UNDERGROUND CABLE

Dear Mr. Taltavall:

When I was in New York some time ago Mr. J. F. Skirrow of the Postal asked me to investigate the matter of a glass-insulated cable of which a section was dug up in Chicago some time ago. I immediately thought of E. S. Williams, superintendent of the Cleveland Telegraph Company, Chicago, who has been in close touch with telegraph matters in Chicago for over a quarter of a century. In reply he wrote me a most interesting letter, copy of which I enclose, which I believe will be of great interest to the readers of your magazine.

You, of course, know of Mr. Williams' record as his biography and photograph have appeared in your paper. I trust that in case you publish it you will give him due credit.

Mr. Skirrow has a section of the cable in his possession in case you should care to have a photograph of it made for your paper.

You will be interested to know that the Morkrum Multiplex which has proven so successful in Postal service, has extended its reputation abroad, and we are now shipping four two-channel terminals to Japan. This is sufficient equipment to provide for two circuits, each of which will have two duplex channels, giving a total per wire of four messages.

The Morkrum Muliplex as used by the Postal Telegraph-Cable Company and Union Pacific Railroad Company, is also of the two-channel type, although three and four channel systems are, of course, available.

Morkrum printers are used on Murray Multiplex in England and some of these provide for as high as six channels.

With very kindest regards, I am,

Yours very truly,

STERLING MORTON,
President, Morkrum Company, New York.

Extract From Letter of Mr. E. S. Williams, Superintendent, Cleveland Telegraph Company, Chicago

Sometime between 1881 and 1884 the Mutual Union Telegraph Company reached Chicago in opposition to the Western Union Telegraph Company. Their office was located in the Merchants building, still standing at the northwest corner of La Salle and Washington streets. The overhead pole wire privilege in the city of Chicago was supposed to be jealously guarded by the Western Union, especially in the down town district.

Reminiscing with old-time telephone and telegraph construction men leads me to believe the Mutual Union Telegraph was more or less blocked in getting down into the then heart of the business district (on overhead lines) which was centered around the old Board of Trade, which was then located on the southwest corner of Washington and La Salle streets, where Chamber of Commerce building now stands.

There were no underground cables in those days, but there was considerable talk of such a thing being possible, but the legend has it: An Englishman named John Bunnell, a carpenter by profession located in Chicago, inherited some money, and in some manner got interested in the Mutual Union Telegraph Company and its difficulties. In order to overcome wire objections (perhaps Western Union injunction) or some other reason, or maybe to get away from storms and wire troubles, he conceived the underground cable idea. This cable was built on the west side here in Chicago, near Halsted and Monroe streets, under the direction of John Bunnell.

It was a twenty wire cable, each wire being insulated with glass. Rosin was used to separate the conductors. It was, of course, made in as long sections as could conveniently be handled by men and hauled on long coupled wagons. It was laid in wooden ducts down anywhere from three to ten feet in the soil. At that time there was little or no underground service in the streets, what there was would usually be found under the sidewalks.

It was discovered after building the cable that wherever a corner was to be turned the cable would have to be cut and a square corner made. The glass insulation, of course, was broken wire cut and spliced, and joints covered with glass sleeves and sealed with rosin.

The cable ran south in La Salle street to what was then known as Calhoun Place (or Gambler's Alley, running east and west, now called Marble Court or Place) east to Dearborn, south in Dearborn, supposedly to Polk street where it was to pick up the overhead wires.

The following letter from Chief Engineer J. F. Skirrow of the Postal Telegraph-Cable Company, New York. explains itself:

Dear Mr. Taltavall:

During a visit by Sterling Morton, president of the Morkrum Company, recently, I showed him a small section of cable that had come into my possession a couple of years ago, which has been a matter of curiosity and interest to a great many people.

This section of cable was forwarded to me by Charles L. Bennett, cable supervisor for the Postal Company at Chicago. Mr. Bennett could not give me much information about the cable illustrated by the sample, except that it had been laid a great many years ago in Chicago and had never been used, and that from time to time sections of it were dug up and he had come into possession of this sample in that manner.

The sample in question has twenty copper conductors, each one in a separate glass tube and all the tubes cemented together inside a lead sheath. Questions naturally arose as to how such a cable could be manufactured and laid. Obviously it could not be rolled up on a reel, and obviously also the joints could not be spread or made in the fashion usually

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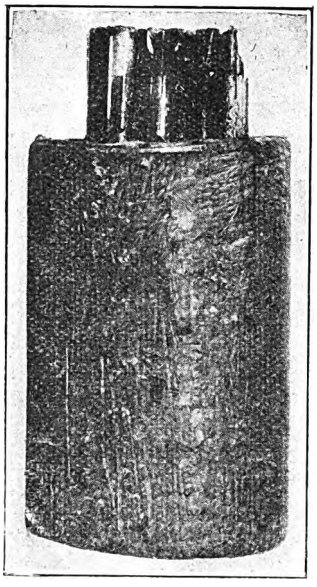
employed where the conductors have flexible insulation. It was also a matter of curiosity to know who conceived such an idea, and why.

Mr. Morton thought that he might be able to get a line on this cable with the data I was able to give him, and Mr. Williams' letter in response to his inquiry was the result.

After the receipt of Mr. Williams' letter I gave our Mr. Bennett the new lead, and asked him to secure further information if possible. He now supplements Mr. Williams' letter with the following information. As a preliminary, he states that a complete accurate story is very difficult to obtain at this time because all of the parties involved in the manufacture of the cable are dead. It is stated, however, that the Mr. Bunnell referred to was George Bunnell, who was a mechanic in the employ of the Mutual Union Telegraph Company. The cable was manufactured in an old shed at the rear of John M. Smyth Company, household furniture manufacturers, on West Madison Street, a short distance east of Halsted Street. The process of manufacture was as follows:



Ordinary plumber's lead pipe was bought in lengths of 40 or 50 feet, bare No. 14 gauge copper wire was strung out, and glass tubes slipped over the wire, after which they were drawn into the lead pipe and then placed in a small box a litle longer than the length of the section of the cable it was intended to make. The box was then filled with a melted rosin composition and this was allowed to penetrate the full length of the lead pipe. The cable thus constructed was removed from this box and placed on a flat top wagon, such as is ordinarily used for hauling stage scenery. The body of the truck was a little longer than the sections of the cable so as to permit the cable to lay straight to avoid breaking the glass insulation. The cable was hauled to the point where it was to be placed in service, being carefully handled by means of a box used as a carrier, and it was placed in the ground without any protection. Joints were made in the usual manner, glass sleeves large enough to slide over the glass tube on the conductors being used. A lead sleeve was wiped over after the splicing of the wires had been completed.

Mr. Bennett's information is that the cable ran south on Dearborn Street to Polk Street to the headquarters of Western Indiana Railway Company. Its other terminal was the old Merchants Building located at the northwest corner of La Salle and Washington Streets, diagonally across the street from what is now the Chamber of Commerce.

After the cable was completed the conductors, tested one at a time, were found to be intact and clear, but in placing the different conductors into service it was found that no two wires could be worked in this cable at the same time on account of the high static effects due to the glass insulation. Any one of the wires in the cable could be worked as a single conductor, which was evidence that they were all clear, and ordinary tests for insulation between one conductor and the others showed that there was no leakage.

I will send you, under separate cover, photographs of the sample piece of cable in my possession, which may in conjunction with the information furnished by Mr. Williams and Mr. Bennett, be of interest to your readers.

Good Morse Operators

I HAVE followed with much interest the article in your November 16, 1923, issue quoting records obtained over the Ford Motor Company and Armour and Company's Morse lines and beg to call the attention of your readers to the fact that these high averages are not confined alone to private wires and in substantiation thereof quote the records obtained in this office on the fifth instant, wherein operator George W. McCallum exchanged with operator Roy Q. Sewell, 164 messages between 10 and 11 A. M.

On the same day, operator George C. Buffington exchanged 186 messages with operator O. O. Hunsaker at Dallas between 12.37 and 3 P. M. Both averages were secured on 99 per cent revenue bearing messages, no padding or injecting of wire messages appearing in their performance.

Such averages are part of the daily performance of these operators and their records for accuracy will compare with those of operators in any service.

JOS. CAHILL,
Chief Operator, Western Union Telegraph Company, Cotton Exchange, New York.

R. SULLIVAN of the Postal Telegraph-Cable Company at San Francisco, Calif., in remitting to cover his subscription for another year writes:—"The 'AGE' never fails to interest a telegraph man."

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Telegraph and Telephone Age

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CONTENTS

PAGE

Sholes Memorial at Ilion, New York 52
New and More Simplified System of Touch Typewriting. New Telegraph Line to be Built 54
By the Horseback Route. By J. D. Ellsworth 55
Transportation and Public Utilities as Fields for Business Careers 56
District Commercial Manager's Work Outlined. By C. P. Corning 57
Marconi Profits. Laudable Undertaking. Wireless Unity in France 58
Western Union Telegraph Company Messenger Force, St. Paul Minn. By D. M. Parks 59
Reminiscences of Vacuum Tube Research. By F. S. McCullough. Western Union Dinner and Dance, London 60
Loudspeakers. By A. Nyman 61
Printer Telegraph Service. By J. P. Phelan. Raven Hart to Morse 62
The Mutual Investment Credit Union 63
Editorial Comment—The Passing of George Clapperton. Chicago and London Linked by Cable. Telephone Lines of International to Girdle Globe 64
Canadian National Telegraphs 67
Obituary. A Telegraph Jubilee. Cresote Bath Lengthens Life of Telephone Poles 68
Personal. Postal Telegraph-Cable Company 70
Commercial Cable Company. Commercial Pacific Cable Company. Telegraph School at Providence, R. I. Western Union Telegraph Company 71
Radio Corporation of America 72
Transatlantic Cable Pioneers 73
Slow Telegraph Service in England. Teaching French by Wireless 74

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SHOLES MEMORIAL AT ILION, NEW YORK

THE 12th of September, 1923, was a marked day in all civilized countries of the world, for it was the fiftieth anniversary of the birth of the typewriter and the day set for the unveiling of the memorial to Christopher Latham Sholes, the inventor of the first practical writing machine.

Up to last September comparatively few people knew to whom credit was due for the invention of the typewriter, as Sholes was a man of extreme modesty, seeking neither glory nor personal profit. When the Herkimer County Historical Society, however, distributed the "Story of the Typewriter" and announced that a memoral would be dedicated under its auspices, the press of the world united in paying tribute to this remarkable man and his great achievement.

Ilion is called "The Typewriter Town." It has a population of about 12,000 and over one-fourth of its people are employees of the Remington Typewriter Company. Practically all of its inhabitants and some 6,000 visitors took part in the ceremonies attending the unveiling of the memorial.

A special train brought from New York, B. L. Winchell, President of the Remington Typewriter Company and about one hundred other officials and guests of the company, including E. E. Loomis, President of the Lehigh Valley Railroad Company, and P. E. Crowley, Vice-President of the New York Central Lines, the latter two in their private cars. In the party were men and women prominent in the early days of the manufacture, sale and operation of the writing machine and in the commercial and literary world.

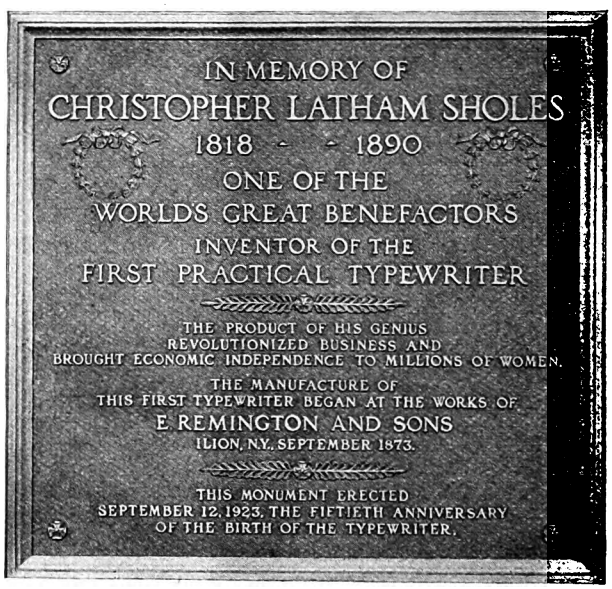
Ilion was in gala attire for the occasion, the numerous industries of the town shutting down for the day. The affair had been widely advertised and early in the morning crowds began to pour in from the surrounding country. The crack local infantry company gave military color to the scene, which was further enlivened by music of the Remington Typewriter Band, one of the best commercial bands in the country which was on duty from morning till midnight.

A morning session, held in the great assembly hall of the Remington Arms Building, in which building the first typewriter was manufactured, was presided over by Colonel John W. Vrooman, President of the Historical Society and such noted personages as Governor Smith of New York, ex-Governor Lowden of Illinois, Henry Harper Benedict, the sole survivor of that wonderful group of men founded the typewriter business, and Owen D. Young, President of the Board of the General Electric Company, were heard.

The Sholes memorial consists of a boulder mounted upon a suitable base, and bearing a bronze tablet telling of the greatness of the inventor and of his invention. The site selected for it is Sholes Park, a tract of about an acre in extent, prominently located in the heart of the town, and the gift of the Remington Typewriter Company. This park has been improved with the usual park landscape features and with the memorial forms a point of interest that will attract multitudes of visitors in the future.

After a banquet to the visitors, the afternoon session of the ceremonies was begun with speeches by Mrs. Lena Lake Forrest, President, National Federation of Business and Professional Women's Clubs and Mrs. Elizabeth Sears, President, New York League of Business and Professional Women. This was followed by the tableau "The Flags of All Nations," about 100 girls, employees of the Typewriter Works taking part.

Then followed the unveiling of the memorial, the flag being removed by Elizabeth and Christopher Latham Sholes, 4th great grandchildren of the inventor. Lillian Sholes (Mrs. Fortier) the first girl typist was present and Charles E. Weller, the first male typist and Mrs. C. G. Sholes, the inventor's daughter-in-law. There was also a large representation of men connected with the mechanical and commercial development of the typewriter. Representatives of the commercial schools were also in attendance.


IN MEMORY OF
CHRISTOPHER LATHAM SHOLES
1818 - - 1890
ONE OF THE
WORLD'S GREAT BENEFACTORS
INVENTOR OF THE
FIRST PRACTICAL TYPEWRITER
THE PRODUCT OF HIS GENIUS
REVOLUTIONIZED BUSINESS AND
BROUGHT ECONOMIC INDEPENDENCE TO MILLIONS OF WOMEN.
THE MANUFACTURE OF
THIS FIRST TYPEWRITER BEGAN AT THE WORKS OF
E. REMINGTON AND SONS
ILION, N.Y., SEPTEMBER 1873.
THIS MONUMENT ERECTED
SEPTEMBER 12, 1923, THE FIFTIETH ANNIVERSARY
OF THE BIRTH OF THE TYPEWRITER.

After the unveiling Ilion took advantage of the occasion for an old-fashioned good time. A base ball game, and a remarkably fine drill given by young women employed in the Typewriter works were followed later by a parade, with numerous brass bands and floats of the important industries of the village, fireworks and dancing on the long asphalted block in front of the Remington Typewriter factory. When the New Yorkers left on their special at mid-

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night, the dancing was still in progress and the Typewriter Band doing yeoman service.

The advance of man from primitive savagery to his present stage of efficiency and enlightenment has been a slow process, but each stage of this process through the ages has been marked, as if by milestones, by some improvement and his means and capacity for recording his thoughts in visible and understanding form.

The story of the typewriter is really a phase of the great story of writing itself, progressing from the earliest attempts at word picturing by savages and leading through the various steps, including the development of the art of paper manufacture, the invention of printing and the comparatively modern invention of the steel pen.

Looking backward from today it is easy for us to see the writing machine as the outcome. One need not be very old to recollect when the typewriter first began to be a factor in business life. The man in his fifties distinctly remembers it all. There are even now some living who were identified with the first typewriter when its manufacture began fifty years ago in the little Mohawk Valley town of Ilion, New York.

Fifty years ago last February two men journeyed to Ilion, bringing with them a curiously shaped box, with some porcelain keys arranged along the floor of a depression in its front and a wooden roller placed over a circular opening in its top. That box was the model from which was made the first practical typewriter, the latest of twenty-five models made by Christopher Latham Sholes, and his co-worker, Charles Glidden.

The first recorded attempt to invent a typewriter is found in the records of the British Patent Office. These show that on the 7th of January, 1714, a patent was granted by Queen Anne to Henry Mill, an English engineer. The first American patent on a typewriter was granted to William Austin Burt of Detroit in 1829. Other patents were granted from time to time including one in 1840 to Alexander Bain and Thomas Wright on a writing machine for use in connection with the telegraph.

All of these inventions proved too slow. The superior legibility of type over script is an undoubted advantage of the writing machine, but it is not the leading one and the transition in the cost of a writing implement from a penny pen to a machine costing upwards of one hundred dollars could never have come to pass on the basis of superior legibility alone. The great outstanding merit of the writing machine is its time saving.

The two men who came to Ilion in 1873 were James Densmore, who had acquired an interest in the invention and G. W. N. Yost, noted for his ability to present business propositions. They were bound for the factory of E. Remington & Sons, which had a world wide reputation for the manufacture of fire arms. It was believed that the machine had progressed to a state that warranted its manufacture and sale and the house of Remington had been selected as a suitable one to undertake its manufacture if they could be interested in the project.

As a result of a contract between the owners of the typewriter and the Remingtons, the manufacture of the first practical writing machine was begun September 12, 1873, an event that was to have a stupendous influence upon the business of the world. The first manufactured machines resembled the sewing machine, the Remington works having been engaged extensively in the design and manufacture of the useful household appliance. It had a foot treadle to operate the carriage return and a stand like the one used for mounting the sewing machine.

The typewriter was not the first evidence of Sholes' inventive genius. Years before he had been the first to conceive of the method of addressing newspapers by printing the name of subscribers on the margin. His work in developing a machine for paging blank books is credited with leading to the invention of the typewriter. Glidden, Sholes' partner, is said to have remarked "Why cannot such a machine be made that will write letters and words, and not figures only", and Sholes went to work upon the idea and continued at it whole heartedly until a successful model resulted.

Charles E. Weller, now a resident of La Porte, Ind., was in contact with Sholes almost from the beginning of his work on the writing machine. Weller resided in Milwaukee in 1867 as a telegraph operator and student of shorthand. Sholes came into the telegraph office one day to secure a sheet of carbon paper, a rare article in those days. Weller knew Sholes as an inventive genius and his curiosity was immediately aroused. A visit to Sholes' office showed Weller a crude experimental affair, rigged up with a single key like a telegraph transmitter which printed through the carbon paper a single letter, wwwwwww. But it printed the letter as fast as the key could be operated. Weller shortly thereafter removed to St. Louis to take up the profession of shorthand reporter.

Sholes promised to send Weller for practical testing the first completed model and in January, 1868, the machine arrived. Sholes, in the mean time, had chosen his own name for the machine, which he called a "type writer." Thus to the inventor himself fell the honor of christening his own creation with the name which has always been universal among English speaking users.

While Weller and Clephane, late in the sixties were demonstrating the utility of the new machine in connection with shorthand reporting, another man was doing similar pioneer work in an entirely different field. This man was E. Payson Porter, an honored name in the history of telegraphy, and long known as the dean of American telegraphers. Porter first saw one of Sholes' models in 1868, at which time he was employed as an operator in the Chicago office of the Western Union Telegraph Company, and he astonished the inventor by the rapidity with which he manipulated the keys at first sight. His

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skill was due to the fact that he had formerly worked a House telegraph printer.

Sholes of course was delighted. He promised Porter the finest machine he could make, upon condition he could receive upon the typewriter as fast as any telegrapher could send a message. In due time the machine arrived in Chicago, and Porter thus described the demonstration which followed. "A sounder and key were placed upon the table and General Stager was the first to manipulate the same for me to copy, which I did readily. Coloned Lynch then attempted to 'rush me' and failing to do so, an 'expert' sender was sent for from the operating room. A thorough trial of my ability to 'keep up' resulted so satisfactorily that the typewriter was taken into the operating room."

This demonstration was made in the year 1869, and Porter's description of it gives the whole gist of typewriting in its relation to telegraphy. It lies simply in the superior speed of the "mill" over hand writing in receiving over the wire, and it is just this difference in speed which in the past forty years has revolutionized the telegrapher's profession. The partnership between telegraphy and the "mill" is as firmly established today as that other partnership between the typewriter and shorthand, and it is worth noting that, in each case, the reality of this partnership was demonstrated at least five years before the first typewriter was actually placed on the market.

It is impossible to picture modern business without the typewriter, for it is used in business whereever writing is done. Over one hundred languages are written upon it. Every other machine for modern clerical labor saving was inspired by the typewriter, including the adding machine, calculating machine, cash register, duplicating machine, addressing machine and the like. Our entire system of commercial education is virtually a creation of the typewriter and this system today extends to every civilized country on earth.

But perhaps the greatest of the typewriter's achievements, even greater than its influence upon education or business or language is the transformation it has wrought in our social order. The writing machine is credited with opening the doors of business life to women. Fifty years ago no real career was open to women outside of the home. Work in shops, factories, domestic service and the like constituted her field, with perhaps the exception of teaching and nursing.

The available opportunities could provide employment but to a fraction of the capable women. The introduction of the typewriter broke down barriers of prejudice and stimulated business activity until the available men were insufficient to perform all of the clerical tasks. Business men had become known as "Slaves of the Pen." The girl stenographer was necessary to relieve men from their pen slavery. The slow method of recording had become a serious drag; the requirements of the time had outgrown the available medium. Then the typewriter came, followed by the girl stenographer.

The typewriter and telephone were born at about the same time. They were both first brought prominently to the attention of the public at the Centennial Exposition in Philadelphia in 1876. Neither was there recognized as something that was to revolutionize business methods and open up new roads to success. But both, with humble beginnings, and in spite of early discouragement, have gone on their triumphant way, until today they are recognized as the two leading factors of the world's communication.

New and More Simplified System of Touch Typewriting

ANYONE who appreciates the growing need for fast typists, and a quicker and easier method of learning the correct use of the typewriter will be interested in a New and More Simplified System of Touch Typewriting that is being placed on the market by Walter H. Candler—author, telegrapher and originator of The Candler System Course of High Speed Telegraphing, which has already won high favor with readers of the Age.

In speaking of the system, Mr. Candler says that in his twenty-five years experience as a telegrapher and typist he has seen only a few typists who adhere strictly to former methods of teaching touch typewriting because of the complexity, and difficulty in following. This being true, whatever benefits the typists might gain from a study of complicated systems is thereby lost. Realizing the waste and inefficiency of such methods he set about formulating a method that could be easily understood and followed by the novice as well as the expert, after reaching proficiency, so that the typist would receive the greatest benefit from its study in the course. Mr. Candler dwells at length upon the actual practical psychology of touch typewriting in such a manner that the student is able by the use of diagrams, charts, etc. to actually learn the position of the fingers, and the keys belonging to each finger, so thoroughly that he can sit down to a typewriter for the first time and type anything he wants to with eyes closed or blindfolded. Something that has never before been accomplished.

Mr. Candler also points out that the methods employed in this new system are at present being used by himself and many of the country's most expert typists with marked success. Those who are qualified to pass on the merits of such a course say that it is far in advance of any other system, and is designed to supplant all other methods of teaching touch typewriting.

New Telegraph Line to be Built

WORK of constructing a ten-wire Western Union Telegraph line between Eugene and Klamath Falls, Oregon, over the route of the new railway being built across the Cascade mountains by the Southern Pacific company, will start soon.

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BY THE HORSEBACK ROUTE

By J. D. Ellsworth

My memory does not go back to the days when I first rode horseback. My father used to say that he had carried me on the front of his saddle in North Carolina before I was old enough to ride alone. In the Iowa town of Waterloo we had a regular mesh of alleys and open barn yards which made it easy for us to play sheep goal on our father's horses. We invariably rode bareback and thought nothing of getting a fall. In fact I counted up to 32 falls before I lost count. When Chicago's Michigan avenue was an unpaved street filled with hay carts and all sorts of farm wagons, I was practicing to be a circus rider and used to ride the future boulevard standing up on the back of my cousin's delivery horse, whenever I could get the use of him.

In Colorado as early as 1880 I was introduced to the so-called bronchos or native horses which had run wild from the days of the early Spaniards and Indians. It was good fun riding them over the plains and into the mountains, and I spent lots of time away from my college work breaking them to drive in a special two-wheeled cart. This cart had long thills. Sometimes it was possible to hitch the broncho so far forward that his heels would not reach the driver's seat, but if he was rangy and long legged we put chains across the thills to receive the kicking.

Gradually from being a tenderfoot, I earned my way up so that I became a recognized cowboy, or "cow-puncher" in the lingo of that day. This was proved when I got a job with a Texas outfit to drive 4,000 head of cattle into the former White River Indian reservation. I was furnished with five scrawny bronchos, not very good natured, and was to receive $30 a month and board. The board meant food from the mess wagon and a place on the ground for my roll of blankets. I furnished my own saddle and outfit. I never made a name for myself as a cow-puncher, partly because I carried Victor Hugo in my saddle bags. The boss thought that reading took my mind off my work, and I am now convinced that he was right. The net result of this work was an ability to rope, or lasso as the tenderfoot would say, my riding horses out of the herd, and some empirical knowledge of the stars. It was from the changing position of the Great Dipper that we knew when it was about time to call the night herder who was due to stand the next watch. Nearly always stars were in sight, but when it rained one kept on guard until the relief chose to come on duty, if ever. In the mountains behind Pike's Peak we night herders had to keep fires going to scare off the mountain lions, but even when the old timers were on duty we would occasionally find a half eaten young steer outside the range of the fires.

In order to recover from the financial depression which resulted from my arduous experience as a cow-puncher, I became a newspaper man. In my early youth I had been a printer's devil in the college town of Galesburg, Illinois, and during my somewhat attenuated connection with the Colorado College I did some reporting in Colorado Springs and in the mining camp of Aspen, which was then forty-five miles from a railroad. A more serious venture into journalism was as editor and publisher of the Coal Creek Enterprise. Except for the extra man power for the Washington hand press on publication days, I was the entire force. It was said in some of the newspapers that the editor of the Coal Creek Enterprise was the youngest editor in the state, and from my present point of view I believe he was also the worst.

Running a weekly paper in a raw coal mining district, three miles from the oil region of the Arkansas Valley where drillers were constantly at war, may not have been a great adventure, but was not without excitement. However, the "Youngest Editor" successively graduated to the daily papers of Denver, Omaha, Boston and New York, pursuing a trade which President Eliot has called the hardest worked and poorest paid of any that he knew.

After about twenty years of newspaper work came an excursion into publicity on behalf of colleges, societies and business concerns. The then president of the American Telephone and Telegraph Company, Frederick P. Fish, had the courage to utilize the Publicity Bureau, and for three or four years I travelled all over the country as a publicity missionary equipped with riding togs. So I was able, just before the automobile made riding impossible, to view the suburbs of the more sizable cities from coast to coast from the back of a horse.

When Mr. Vail became president in 1907 he began to make plans to make the Bell System, that is the American Telephone and Telegraph Company and Associated Companies, better known and better understood by means of publicity and advertising and by other means of which he was a master. I had severed my connection with my colleagues of the Publicity Bureau. Through the friendly offices of Charles S. Gleed, Casper Yost and E. J. Hall, I was employed by Mr. Vail as special agent, with a commission to find a job for myself along publicity lines if possible.

Thanks to the instruction I got from Mr. Vail himself and from E. J. Hall, U. N. Bethell, F. A. Pickernell, Nathan C. Kingsbury and H. B. Thayer, not to speak of that which I received from the publicity managers of the Associated Companies as fast as they came into office, I have thus far managed to hang on to my job. My successive sponsors must have seen how much I loved my opportunity, if I may call it that, and therefore did not have the heart to divorce me from it.

Suffice it to say that I have managed to stick around within shouting distance of the Bell System

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for nearly twenty years, and they have been the happiest years of a very happy life.

My advice to an orator or writer when he gets to his peroration is to make it snappy. It is a hard thing for me to do, because by this time I am all enthused with the sentiment of my subject.

The more I know of the Bell System, the more I admire it. The more I learn about telephone service the more of an inspiration it becomes. The longer I live with telephone people the fonder I am of them.

The back of a horse gave me the blessing of health and the newspaper work gave me some measure of human understanding. That's about all I have to give to the service of the Bell System, but it is a joy to give even that. Those of you who have so much more to give—well, I can only imagine your satisfaction—*Mountain States Monitor.*

Transportation and Public Utilities as Fields For Business Careers

By W. Rufus Abbott *in Chicago Commerce*

When we contrast our modes of living with those of half a century ago, we find the differences due almost entirely to the services supplied by our public utilities.

All the money of a millionaire of fifty years ago could not have bought the comforts and conveniences enjoyed by the majority of working men to-day.

The use of the telephone, gas, electricity and electrical transportation has increased in the past few years much more rapidly than population. Take the telephone for example: In 1890, there was one telephone to 161 persons in the city of Chicago. In 1900, the ratio had increased to one to fifty-five persons; in 1910, this ratio had become one to nine. In 1920, the ratio was one to five and it is now about one to four and a half. The use of the other utilities also has increased at a much greater rate than population.

All this means a steady and increasing demand for trained and educated men and women. Take the telephone service again for example. In 1890, fewer probably, than 500 persons sufficed to give all the telephone service then rendered in the state of Illinois. In 1923, the Illinois Bell Telephone Company alone employs 23,000 persons. Included in this number are general and departmental executives, supervisory forces and technical experts in many lines. Those filling these responsible places have come up from the ranks.

Other Chicago utilities have also shown enormous growth and expansion. In 1889 the output of the Chicago Edison Company was 874,000 kilowatt hours. The present yearly output of the Commonwealth Edison Company, successor of the Chicago Edison, is about 2,000,000,000 kilowatt hours, while the service is furnished to 500,000 homes, factories, railways, stores and offices.

The Peoples Gas Light and Coke Company supplies gas service to practically every home in Chicago, more than 650,000 of them. The gas service is the oldest of public utilities, and the Chicago gas supply has been continuous since 1849. This service has kept pace with the growth of the city and is highly efficient.

Chicago's transportation service has grown from a few horse drawn cars, operating in a small area, to a splendid system of electric surface and elevated lines reaching the most remote sections of the city. The Chicago Surface Lines exceed any other city railway, surface, elevated or subway in the world in number of miles of track, number of cars, number of car hours and car miles operated and of passengers carried. The Surface Lines employ more than 16,000 persons.

The men and women who are responsible for our public utilities have reason to be proud of their occupation. They are performing a great and valuable service to their fellow men. They enjoy unusual opportunities to perform individual acts of service and these are always suitably recognized by the public and the employers. Many of the utilities have liberal arrangements whereby their employees may become partners in the business through the purchase of stock on very easy payments. If a man or woman hopes to get rich in a hurry, perhaps it would not be advisable to enter utility work. But those going into this work are assured of good pay, good working conditions, the opportunity to become partners and the inspiration which goes with doing a good job—working shoulder to shoulder with other men and women giving the best that is in them.

The public utilities are among the most stable of our industries. Positions in their service are, therefore, permanent. If the employee's work entitles him to promotion, it is sure to come.

Utility companies strive to merit public approval and patronage, by efficiency, square dealing and courtesy. As all their employees are in touch with the public, they aim to employ the young people who are energetic, dependable and conscientious, avoiding those who are frivolous and careless in disposition.

We are led to suggest, therefore, that high school students should consider that school work is really a form of business. If students give it painstaking effort, are always "on the square," sensible and courteous in relations with others, they will acquire habits which will later help to make their business life successful.

The greater opportunities offered in the utility field should prompt young persons leaving school or college to give this occupation careful consideration.

Utility companies are always on the lookout for young men of technical training who appear to have promising qualities. Young women will also find that work with the utility companies is very agreeable.—*Bell Telephone News.*

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District Commercial Manager's Work Outlined
His Relations to His Subordinates and to the Public Explained.

By C. P. Corning

The duties of the district commercial manager cover the supervision of the work of the commercial managers in his district, for which he is responsible to the division commercial superintendent. The personnel of the district commercial manager's office should include a chief clerk and a stenographer. In supervising the work of the commercial managers, care should be exercised so that the managers are vested with all possible authority in the handling of the work in their exchanges.

The district commercial manager should keep himself posted on all conditions which arise in the entire district and should be in constant touch with commercial managers. The relations between the district managers and the commercial managers should be such that the managers will feel at liberty at all times to go to the district manager for advice and counsel.

In the matter of public relations, the district commercial manager should think of himself as a representative of the company as a whole rather than merely of the Commercial Department, and should cooperate closely with the other departments of the company, especially the Plant and Traffic Departments and the auditor's office. He should hold regular meetings with the commercial managers and supervisors of the other departments and discuss with them the different situations with a view to improving the service to subscribers and promoting better public relations. He should maintain the closest possible contact with actual conditions in his territory, and should be on a constant watch for ways in which the company's service to the public can be improved. The district commercial manager should, at all times, keep the division commercial superintendent, fully advised regarding the conditions in his district.

The chief clerk in the district commercial manager's office holds a responsible position, as he is the district commercial manager's representative during his absence and on him devolves the handling of many problems brought before him during the absence of the district commercial manager. The chief clerk should handle all matters of a routine nature in the district office; see that reports are properly complied and forwarded; see that all complaints are referred to the proper department, followed up and promptly cared for.

Local Commercial Office

The ideal local commercial office should be so located as to be easily accessible to the public and should be housed in a modern building on the ground floor and should be suitably furnished. It should be well ventilated and have a maximum amount of daylight. It should be equipped with a counter so located that it is convenient for the public in the transaction of business. There should be in this office a sufficient number of pay station telephones so there will be no delay because of all booths being in use.

In the larger offices where the work of taking care of the public is divided between four or five employees, the counter should be so arranged with signs that the public can immediately reach the proper location with little effort.

The desks in the office should be so arranged that all clerks especially those taking care of the public, should face the counter at all times.

The personnel of the commercial office should include:

1. Commercial managers—Reporting to the district commercial manager and in charge of a group of exchanges; reporting direct to the commercial manager are:
2. Chief clerk.
3. Collectors.
4. Commercial agents.
5. Commission managers.

The chief clerk should be in immediate charge of the commercial office and should have reporting to him:

1. Cashiers.
2. Clerks.
3. Stenographers

The force in the commercial office should be at all times so flexible that the absence or resignation of any members of the office would not interfere with the proper handling of business. In order to accomplish this, some educational program should be worked out in each office to acquaint employees with the phases of the work. The organization should so function that one or more employees would be familiar with and capable of filling any position, thus eliminating serious interference or delay in handling the work.

Access to the commercial office by the public may be had by any one of three routes:

(1) Over the counter.
(2) Through the mails.
(3) By telephone.

Treatment of Those Transacting Their Business in Person at the Office

In taking care of subscribers who wish to transact their business in person at the office, it is important that the public counter should be so arranged that so far as possible, all work of the same nature can be handled in the one section.

That part of the office occupied by the cashier should be so located as to be easily accessible to the public and still separated, as much as possible, from the rest of the office. The cashier should have sufficient help so that there is no noticeable delay in the handling of the public. A patron should never be left standing before the counter without receiving attention.

Adjustment of Subscribers' Disputes

If the patron has some item in dispute, he should

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be referred to the employee handling adjustments. If it is found necessary to change the amount due, it should be changed on the bill, which the subscriber returns to the cashier with payment.

The cashier and his or her assistants meet from month to month, a larger percentage of the company's patrons than any other set of employees of the company. For this reason they have a greater opportunity to advance the company's cause. The known to most of the telephone folks, "Frank and Ed." The street car company also has a very efficient man handling its end of the situation in Mr. Haacker, whose duty is to see that we don't let the cars run over us, etc.

As stated above, these men have a most difficult task cut out for them and without question, they are making a fine job of it, so it is up to telephone folks not to make the task a harder one but to make it easier. This can be done by obeying the signals. Remember, they are there to help you. Wait for the whistle, cross with the traffic. Cross only one street at a time. Cross only at regular street crossings. Keep your eyes and ears open and your brain alert and keep to the right. In other words, don't be a jay walker!—*Bell Telephone News.*

Marconi Profits

THE fact that only a week or so ago "Broadcasting" celebrated its first anniversary is a reminder that the new branch of activities of Marconi's Wireless Telegraph Company had not had time to make itself felt upon the accounts for 1922, which are just issued. *No indication of its progress in the financial sense* is given by the directors in their report, but *presumably* the Chairman will be able to enlighten the shareholders as to the present position at the coming meeting. So far as profits are concerned the company appears *more or less to have marked time during last year,* gross profit being returned merely £2,900 higher at £557,400. A trifling provision has to be made for debenture interest on this occasion, but the general trend of expenses has been downward, so that net profit for the period, which amounts to £302,900, is £27,600 better than in 1921. It is owing, therefore, to the fact that £153,700 less was brought into the accounts that the disposable balance reveals a shrinkage of £126,100 at £967,800. More ordinary capital ranks for dividend, the amount in issue now being £2,750,000, compared with £2,621,600 fully and £15,300 partly paid twelve months back. Hence the dividend for the year, which is maintained at 15 per cent., requires £412,500, compared with £397,100 a year ago. The 12 per cent. disbursed on the Preference capital requires £30,000, as before, so that in all payments on the two classes account for £442,500. The surplus carried over has dropped £141,600 to £525,300.

Once more the directors record that many questions previously opened remain unsettled, *"so that the accounts do not reflect the true strength of the company's position."* The year, in fact, was one of extreme difficulty—*the phrase used on the previous occasion was "unprecedented."* Politics and exchanges again have been untoward influences causing restriction of business, while once again it has to be stated that no settlement has been reached with the Government in respect of claims arising out of war and post-war services. There seems to be some slight ground for optimism in this connection, as the hope is expressed that as a result of negotiations now going on, and having for their object a reference of all the questions to a single arbitrator, it may be possible to make some more definite statement at the meeting. Another record of disappointment is to be found in the failure to mature of an agreement with the Postmaster-General in respect of telegraph business overseas. Apparently it was in the belief that these matters might be brought to fruition that the meeting was deferred. While that has not happened yet, the silver lining may be seen in the statement that the directors are not without expectation that matters may be brought to a satisfactory conclusion.

As the result mostly of the inclusion of increased capital, the entries of assets in the balance-sheet are larger. Sundry debtors figure for £453,600 more at £1,394,800, while sums due from associated companies have risen £418,600 to £2,003,400, and shares and patents stand £206,300 higher at £3,543,500. Stocks, taken at cost or under, display an advance of £44,400 to £554,400, while investments and fixed deposits aggregate £325,200 more at £1,644,100, and cash has grown by £43,900 to £168,600. Open accounts exhibit an expansion of £153,700 to £384,600, while the general reserve account remains practically as before at £3,986,400 after the discount on and issue expenses of the Debenture stock have been charged against it.—*Financial Times,* London, November 11, 1923.

Laudable Undertaking

AT the Montreal Convention of the Commercial Telegraphers Union of America, action was taken looking to Memorial Day observance throughout America in honor of the memory of S. F. B. Morse, inventor of the Telegraph. Provision is to be made for the presentation of an appropriate bronze bust of the inventor to the Hall of Fame.

Wireless Unity in France

A FRENCH Wireless Union has been formed at a general meeting of experts, professionals and amateurs. The object of the new body is to protect the interests of all wireless users, to provide resources for research work and to maintain France's present position in the field of radio.

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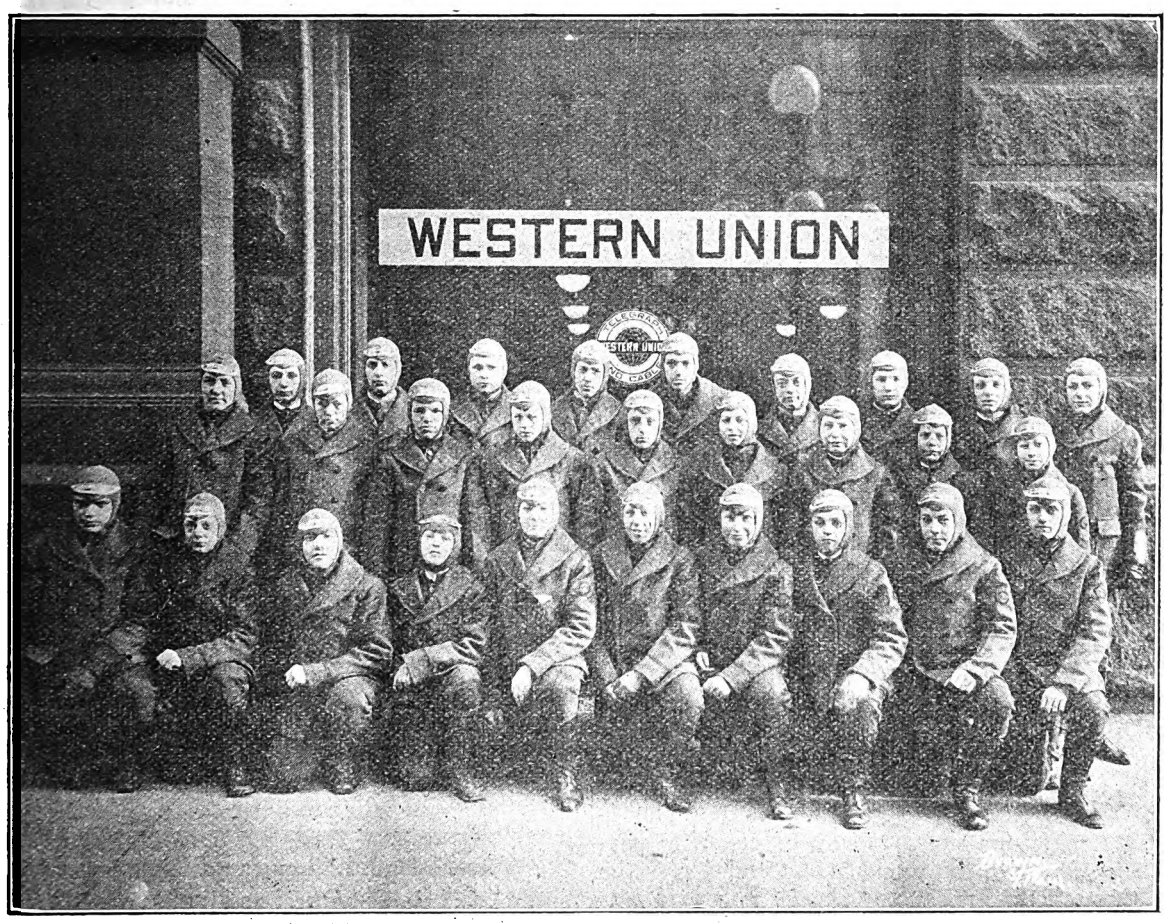
Western Union Telegraph Company Messenger Force, St. Paul, Minn.

By D. M. PARKS, *City Superintendent*

THIS engraving is not a football squad notwithstanding the fact that they do resemble that kind of manhood Walter Camp selects for his all American material, nor are they members of the Aviation forces regardless of the fact that they seem to fly when they go out on pickup and delivery runs.

They are worthy representatives of the Western Union Telegraph Company, St. Paul, Minn., Main office fast messenger force, and after you have looked them over I am sure you will know why we say without fear of contradiction that they are the "Fleetest" and "neatest" crew in the universe. Practically every one of them has some outstanding ability for which he is known throughout the city and the unselfish spirit which prevails among the boys makes it possible for each one to profit through his association with the other.



Earl Wiess second from the last, top row, is president elect of the WUTCO Club. He formerly was a basketball star on the track Central High School squad. During the recent answer getting contest he made use of his former basket shooting ability by shooting in enough answers to win the five dollar gold piece offered as first prize.

Sherman Murry, extreme right center row, although the smallest boy on the force, "four feet ten inches" is one of the cities best swimmers and to swim seventy-five feet under water at record breaking speed to Sherman is as easy as saying," I will be pleased to wait for the answer message."

Walter Kelley, extreme left middle row, is the champion fast bicycle rider of the city and he has also won prizes for long distance races.

Members of the famous flying squadron qualify by their time in running the one half mile track at the Y. M. C. A. At the present time Leroy Shea fifth from the left, front row and Clifford Kliest extreme right, last row occupy two of these coveted positions.

All of the boys are enthusiastic members of the Y. M. C. A. and under the leadership of Money Transfer Agent W. E. Dickman, attend regularly Thursday evening at which time they spend thirty minutes in games and exercises on the floor and thirty minutes in the Gymnasium pool. Semi-monthly meetings are held by the WUTCO Club. Matters pertaining to their positions are discussed and short talks made by various speakers. A number of the boys through their gentlemanly conduct and excellent handling of our patrons business have received offers of positions with other concerns, but after the conference over the dinner table with dad and mother were back to work the next day, which bespeaks of the confidence that parents of the

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boys have in our company.

So we suggest that you again take a good look at each one of them for who knows what you may be gazing on the countenance of the future president of the Western Union Telergaph Company.

Reminiscences of Vacuum Tube Research

By F. S. McCULLOUGH, *Research Engineer, Westinghouse Electric and Manufacturing Company.*

THE forerunner of the vacuum tube was the experiment of Edison in 1883, when he observed an electric current between the plate and a hot filament in a vaccum. At the same time some German scientists were working on it. The work of Edison was followed by Preece, Fleming and Thompson, English scientists. It was not until 1898 that Sir J. J. Thompson suggested an explanation of this phenomenon. About this time Marconi introduced radio telegraphy. Sir J. A. Fleming applied the Vacuum Tube for detecting radio signals in 1904. In 1905 DeForest, an American, changed this vacuum tube. The new tube was able to amplify the signals. Then in 1913, E. H. Armstrong invented an electric circuit, which with this tube was capable of producing oscillating currents suitable for sending radio waves or regenerating received signals. By regenerating we mean, multiplying these signals hundreds of times. This, briefly, is the history of the vacuum tube. Larger tubes of this type are used at the broadcasting stations. For transcontinental telephone transmission, telephone companies are using a similar tube. In appearance, the vacuum tube looks somewhat like an electric light bulb. It has a glass bulb for maintaining a vacuum. This bulb is sealed in a metal-base mounted inside the tube there is a heated filament surrounded by a complicated metallic structure. The radio engineer knows this as the grid and plate. The outside of the structure is a thin metal plate formed into a cylinder or an oval. Between this plate and the filament, you will see a wire coil or a mesh. This is the grid. Now imagine a stream of electrical particles shooting out from the filament and across the space through the grid to the plate. This grid acts like a door. By opening and closing this door you can vary the amount of current that goes through; only you open and close this door electrically, and not mechanically. Just like a small child can open a door for a grown up person, so can the small electric currents open a door for large electric currents. That is exactly how a vacuum tube works.

To produce this tube, the scientists and engineers had to solve quite a number of technical and scientific problems. Years of research and millions of dollars were spent on developing the materials, the methods, and the machinery for the manufacture of these tubes. To give an idea of what these problems are; let us compare the vacuum tube to an electric light globe. In an electric light globe we have a vacuum which has about one millionth of ordinary air. In a vacuum tube there is ten million times less air than in an electric light globe. Imagine the trouble of getting this vacuum. When you get nearly this far, the glass walls and the metal parts inside of the tubes begin to give off gas. Before vacuum tubes were invented, the scientists did not even know that the glass and the metals could contain gas. Now they had to find a way to remove the gas, and make sure no more gas would come out after the tube is in service. It may be interesting to observe that with all this vacuum an average receiving tube will still contain about ten to twenty billions of atoms of gas. You have seen tubes with a bright filament and a dim filament. Some need a storage battery, while others will burn with a dry cell. It is seldom realized that dry cell tubes take only one twentieth as much power as a storage battery tube, yet it gives the same service. However, a large amount of experimental work had to be done before this small amount of power could be made to do the work. The engineers had to develop a filament of extremely fine dimensions. This filament is one fourth of one thousandth of an inch thick and ten thousandths of an inch wide. This means that it would take four thousand of these filaments to make up one inch if laid side by side. This filament must be then coated in a delicate manner with a layer of active material. When you consider that this filament must be mounted in the center of the coil one sixteenth of an inch wide, you will get some idea of what the difficulties are. The other extremes in vacuum tubes are the power tubes at the broadcasting stations. These tubes are made at the present time in sizes which range up to 1000 kilowatts. This means that they are capable of delivering about 1300 horse power of radio energy to an antenna. Of course, no broadcasting station is now allowed to use such an amount of energy. When this will be allowed, one broadcasting station will be able to reach the extreme ends of the earth. This day is not far distant. A few years from now you may be able, on your set, to listen to one station in London and another in Pekin.

Western Union Dinner and Dance, London

THANKS to the interest and initiative of the Southern Divisional Manager, C. V. Auger, the Hamilton Hall, Great Eastern Hotel, was available for the Staff Dinner and Dance on January 14th, for when Mr. Auger succeeded in booking the date last March there were then only three remaining dates available. Some 300 members of the Staff and their friends took part in the function, the quality of which was guaranteed by the auspices under which it was run, and it was confidently anticipated that it surpassed any previous Western Union functions of this nature.

LONDON is to be linked up by submarine cable with Germany. The new cable is now being laid connecting Emden, Germany with London, England. The work is being done under the supervision of the Eastern Telegraph Company.

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Loudspeakers

By A. NYMAN, Radio Engineer, Westinghouse Electric and Manufacturing Company

THE loudspeaker is really the voice of the radio, converting the radio set into a musical instrument. Like any voice, it may be good or bad, and therefore a careful selection of a loudspeaker should be made with regard to its quality, volume, and purpose, in order to be sure that the sound it gives will correspond to the sound sent out from the radio station.

It is a well known fact that any sound can be regarded as vibration in air. Some sounds are vibrations at a definite rate, or pitch; others are vibrations at an irregular rate of rising or falling magnitude. You can distinguish between a pure sound of a definite and continuous pitch, such as the sound of an organ pipe or a flute; a complicated sound, which may consist of a blending of a number of pitches, as the voice of a person; or an abrupt sound, like the sound of a piano. It is evident that a complicated or an abrupt sound is much more difficult to reproduce than a pure sound.

The loudspeaker which is to reproduce all the musical instruments, and also all the voices that may be transmitted over the radio, must contain the qualities of all the different voices and instruments to be able to reproduce all sounds without any of its own characteristics. So far no loudspeaker has fully achieved this perfection. Any instrument possessing a horn, a diaphragm, or a reed, will have its own characteristic sounds, which may be suppressed to a certain extent but not entirely eliminated. It remains with the listener to decide which loudspeaker is most capable of reproducing the largest number of instruments and voices with the greatest fidelity.

Almost all loudspeakers will reproduce a pure note with a fair degree of accuracy. If a pure note gives a rattling or scratching sound, it is certain that the loudspeaker cannot reproduce a complicated sound; but, on the other hand, the fact that a pure note comes through clearly does not necessarily mean that a complicated sound will be faithfully copied. The same loudspeaker may reproduce a low-pitched note much weaker than a high-pitched note. A complicated sound, which contains both these pitches, will appear distorted because its low pitched component will be weak compared to its high pitched component.

This shows two qualifications necessary in a good loudspeaker. The first is clearness of pure sound at different pitches; the second is equal loudness of sound at different pitches. But even these qualities are not sufficient to reproduce all complicated sounds correctly. A third necessary qualification is that in a complicated sound the individual pitches should get through in the same proportion that they have in the original sound. A fourth qualification is that the natural sound of the loudspeaker should be eliminated as much as possible. The natural sound of the loudspeaker is dependent on the horn more than anything else. The longer horn gives the effect of a lower and a more pleasing pitch. By a suitable design this effect can be reduced to its correct proportion.

A person desiring to choose a loudspeaker with the best qualities possible should make the following tests:

First: Listen for a pure sound, such as that from an organ or a flute, or from a clear voice singing a sustained note; or if such tones are not available, the usual kind of "howl" on the radio set may be used. If you run this howl through the full range, you can tell fairly well if any particular pitches come through unusually loud, or if other pitches are somewhat weak. If the loudspeaker gives all pitches without a rattle, and at a fairly even volume, you may expect this loudspeaker to give a rather good reproduction of all kinds of music. If one or two notes are particularly prominent, you will find that in reproducing music these notes will always ring too loud, and if the voice happens to strike these notes they will distort the quality of the voice. However, if one or two notes are missing, the quality is not impaired to any great extent. It is only when a range of notes is missing (for instance, all the low notes, or all the high notes) that the quality of both music and speech will be impaired considerably.

This test by means of the "howl" of the set will, as a rule, show you better than any particular selection of music or voice whether a loudspeaker can reproduce all kinds of music and voice satisfactorily.

The second test is made with piano notes. The piano gives a very abrupt sound, generally consisting of a blending of several pitches which are known in music as the fundamental and its overtones. In order to reproduce this sound correctly, the loudspeaker must have superior qualities. Some times the low notes on the piano seem to come through very clearly but, somehow, a musician would not think that the piano is reproducing correctly. He would speak of it as sounding "tinny." This would give a fair indication that these low notes miss their fundamentals and only reproduce their overtones, or high pitches.

A third test, and probably the most important, is the test of the voice. The voice, particularly the speaking voice, is an extremely complicated sound. It consists, generally, of a blending of a number of pitches. Sometimes as many as twenty or thirty pitches are necessary to produce the quality and the inflection of the voice.

An increase or decrease in any one of these pitches will change the quality or inflection. Personal judgment is, of course, the only way to determine the quality of the loudspeaker. If you hear a person, whose voice you know, talking by radio, you can judge the quality of the loudspeaker by the naturalness of the voice, particularly by its inflections. The pitch of your friend's voice may appear lowered or raised a certain amount, due to characteristics of the horn, but that would not necessarily impair the qual-

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ity. If you do not know the person talking, the best test you can make is to get far away from the loudspeaker and try to understand what is being said. With a good loudspeaker it is possible to go to a different part of the house, shut the door, and yet understand clearly.

In addition to clearness, another quality of speech should be considered also. A loudspeaker may give very clear speech, but with an accent on some particular sound, as the "ah" sound. Although this does not necessarily make the loudspeaker undesirable, yet the effect of this accent during a long talk will probably be annoying and cause some of the listeners to beg to have it shut off.

In testing the loudspeaker, and also in using it, it is essential that the radio station, the radio set, and the amplifier with which it is used all give good quality. A poor amplifier, or a radio set improperly adjusted, will make the best loudspeaker sound like the worst. It is sometimes difficult to get a distant station on the loudspeaker to sound clear. The usual effect is to accentuate the low notes and suppress the high ones. All voices are pitched low, and the music seems to consist of the booming of drums and the low notes of the piano or orchestra. This effect is due to the closeness of adjustment of the set and can be corrected only by the use of a more powerful set which does not require such close adjustment.

In conclusion, let us consider the place where the loudspeaker is to be used. In an ordinary living room of a small house, it is not necessary to have a loudspeaker that gives a large volume of sound. Quality is far more important, and a weak loudspeaker with a good quality will be found far superior and more pleasing. A loudspeaker capable of an enormous volume has its uses for outdoor demonstrations, dance halls, or auditoriums. A house with large rooms, where the loudspeaker may be used for dancing, requires a fairly large volume from the loudspeaker. As a rule, dance music must be made louder than speech or music of purely artistic value.

Printer Telegraph Service

By J. P. PHELAN, *American Telephone and Telegraph Company, New York*

THE printer was first introduced to the Plant Department approximately ten years ago, prior to which time many mysterious tests were made of the printer machines by the Engineering Department. Considerable interest was displayed by those who saw the machines when it was learned that it was possible to transmit electrical impulses over an ordinary telegraph line from a transmitting device at the sending end and transcribe these impulses by means of the receiving machine at the distant end into printed words. Any wire which can be used for satisfactory telegraphy can also be used for the printer telegraph. There is also an advantage from a facility standpoint, as it is possible to operate two or four printer circuits over one telegraph channel. The number operated depend upon the characteristics of the line used.

This qualification doubles or quadruples the messages which can be handled over ordinary duplex telegraph circuits. When the new systems now in use in the Plant are considered (the carrier current and voice frequency telegraph) whereby so many additional lines or channels are derived, the possibilities for developing this branch of our service look promising.

The first commercial installation made by our company around New York was furnished for the United Press Association, known locally as the short line printer. This consisted of a transmitting station in the World Building, 63 Park Row, and several receiving stations located in Manhattan, Jersey City, Hoboken, Passaic and Paterson, over which the news association transmitted news items to their local correspondents. Many were the trials of the force maintaining these printers in the early days. However, under the leadership of Messrs. Eich and Bastido of the New York Company's printer shop, with the co-operation of R. D. Parker, E. F. Watson, R. E. Pierce and G. S. Vernam, of the General Department, the various troubles experienced were overcome.

In the early part of 1917 the Plant Department formally took over the responsibility for the operation of printer service. Since that time it has slowly grown and been improved upon until at present we are operating at New York twenty-six stations with distant terminals as far west as Chicago and St. Louis and as far south as Atlanta and New Orleans.

The official business of our Company at New York is handled by a force under the supervision of James Dorler at Company headquarters, 195 Broadway.

— *Long Lines.*

Raven Hart to Morse.

THE name of A. H. Morse, the well known electrical expert of Montreal, Que., has several times appeared in these columns. One of his articles caught the eye of an old comrade now in Buenos Aires, Argentine, who writes as follows:

February 2nd, 1923.

Dear Mr. Morse:—

I wonder if you remember me? I was with you on the old United Wireless Company in London years ago, then Central Argentine Railway, then the war (Major, General Staff—Wireless Intelligence) and now division telegraph engineer for this railway, Ferro Carrill de Buenos Aires al Pacifico Calle Florida 783, Buenos Aires.

Please accept best wishes for your success in new venture, whatever it is—Telegraph and Telephone Age, January 1st, 1923.

Yours sincerely,

(Signed) R. Raven Hart.

DON'T throw breakable things from the windows.

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The Mutual Investment Credit Union.

THE fourteenth annual meeting of the Mutual Investment Credit Union was held on January 15th, a large number of members being present to listen to the reading of the report for 1923. The report, shows that the association is in good shape financially, reflecting credit upon Edward Reynolds, president and F. J. Kernan, secretary and treasurer, and all other officers connected with the management of the association.

The report, as presented, reads as follows:—

"The Mutual Investment organization of the Postal Telegraph was formed January 1st, 1909. It has been doing a successful business for fourteen consecutive years. It has more than fulfilled the expectation of its promoters. It started with the purpose of assisting the associated employees of the Postal Telegraph service in forming habits of thrift by systematic saving and to provide financial aid by means of small loans in time of financial difficulty. Its work has been carried well beyond the point originally fixed by its founders. It solved the problem of the loan shark evil, something that many other large concerns and the police authorities have endeavored for years to solve without success. We have solved it as far as it affects the employees of the Postal Company. If the Mutual had paid no other dividends, the investment made by it in correcting this abuse will have been worth while. It is an accomplishment in which we may well take pride. In the conduct of our business we have followed a line that has enabled us to help those who have been in need of financial assistance in a way that has relieved them of embarrassment. We have started many on the road to prosperity.

Following is a statement that reflects the financial position of the Mutual Investment Credit Union as of December 31st, 1923.

WE OWE FOR:		
Unpaid dividends	$	37.90
For Funds set aside to cover Bad Debts		4,509.23
" Savings deposits		107.86
" Cash borrowed from bank to finance loans		1,000.00
" Shares purchased and paid for		47,626.00
	$	53,280.99
TO MEET THESE OBLIGATIONS, WE HAVE:		
Cash in bank	$	1,883.84
U. S. Liberty Bonds in safe deposit vault (cost price)		30,823.49
Due us on loans, all of which are good		24,652.19
	$	57,359.52
UNDISTRIBUTED SURPLUS	$	4,078.53
The Earnings and Expense of Operation for the Year 1923 Have Been as Follows:		
Receipts from loans and for bond interest	$	5,028.16
Expense for salaries, printing, stationery and postage		2,004.96
Excess of receipts over expenses for the year	$	3,023.20
Under the Banking Law we must carry to the Fund out of current profits for Protection of Bad Debts		2755.80
Leaving a Net Earning for the year 1923, of	$	2,267.40

The books of account are in good shape. Our losses have been too trifling to be worthy of consideration. The Association is in a sound, healthy condition.

The Mutual Investment has paid dividends every year from the start. The dividend this year will be at the rate of eight per cent per annum.

Your association was a pioneer in the field of character loans to wage earners. It has proven that loans of this character can safely be made and with a sufficient return upon the money loaned under legal rates of interest.

It is very gratifying to those of us who are associated in the service of the Postal Telegraph System to be able to say that its employees who have had occasion to borrow from the Association at times of pressing financial need have been found worthy of the trust placed in them by promptly meeting their obligations. It is another evidence of the spirit of loyalty and conscientiousness that prevails within our organization, sometimes referred to as the "Postal Spirit."

Respectfully submitted, Edward Reynolds, President; F. J. Kernan, Sec'y and Treasurer.

After the reading and the adoption of the report, the following were elected as directors: Messrs. Edward Reynolds, Charles Shirley, F. J. Kernan, C. A. Comstock, W. C. Daviet, C. F. Leonard, and F. G. Payne.

The following were elected members of the credit Committee: Messrs. J. J. Cardona, F. F. Norton, M. F. Geigle, F. E. McKiernan and J. J. McDermott.

As members of the supervisory committee, the following were elected: Messrs. J. F. Skirrow, A. W. McNeill and C. Maurer.

Following the election, a motion was made that a vote of thanks be given to Edward Reynolds for the able manner in which the affairs of the Credit Union were handled and the motion was seconded and carried.

At the conclusion of the annual meeting of members, a meeting of the new board of directors was called to order, at which the following officers were elected for the ensuing year: President, Edward Reynolds; Vice President, Charles Shirley; Secretary and Treasurer, F. J. Kernan.

Following the election of officers, it was decided to declare a dividend of eight per cent to all stockholders.

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EDITORIAL COMMENT

The Passing of George Clapperton

WHEN George Clapperton came to the United States he was twenty years of age and there were four submarine cables in operation between America and the British Isles—that was in 1874.

When one visualizes the seemingly unending ramifications of present day commercial enterprises and compares, as well as this can be done, a modern large scale business undertaking with the task of setting up the channels of transocean communication consisting of the first half dozen transatlantic cables, much light is thrown upon changes which mark the flight of time.

The cables, as rapidly as they could be manufactured, laid and operated, found at hand a volume of traffic which increased naturally as facilities were provided for its handling. The employment of paid propaganda, publicity and advertising was not necessary and was not thought of as a means of developing paying message loads for the cables.

The devlopment of and the satisfactory operation of the facilities constituted the task of those engaged in the work and among the small group of men who launched this great service, none served more intelligently, more faithfully or more successfully than George Clapperton.

Continuously during the past fifty years Mr. Clapperton was intimately identified with every worthwhile forward step made in cable telegraphy. His association with the eminent cable builders and inventors, Ward, Dickenson, Wilmot, Cuttriss, and others were close. In cable circles the world over the achievements of these men are regarded as having set the pace in submarine cable development, and this holds true down to the present day.

Mr. Clapperton was a Master traffic manager and throughout his half century of service (since 1884 with the Commercial Cable Company at New York) he held a high place in communication councils. In all matters he exercised a calm, conservative reasoning which won for him the respect of associates and subordinates.

The impressive funeral service held at the church of St. Matthew and St. Timothy, New York, on January 14th, was attended by executives of all communication companies located in New York, and was a well merited tribute to the memory of a man who played a large and honorable part in the affairs of the world over a long period of time.

Chicago and London Linked by Cable

LONDON, England, was connected with Chicago for the first time in history on January 7, when one of the Western Union Telegraph Company's seven trans-Atlantic cables was "cut through" at New York and direct service from the world's largest city to the metropolis of Western America was inaugurated.

Mayor William E. Dever of Chicago personally visited the Western Union Operating Department and filed the opening message directed to the Lord Mayor of London and the latter promptly replied.

Mayor Dever's message read:

"As Mayor of the City of Chicago I have pleasure in sending greetings to the City of London by means of the first direct cable connecting the two cities.

"I hope that this newest and most direct method of communication will serve to promote the relationship and interests of our respective cities. Cordial good wishes."

Lord Mayor Louis A. Newton replied as follows:

"I thank you for your message of greeting on the opening of direct cable communication between the City of Chicago and the City of London inaugurated to-day by the Western Union Telegraph Company. This new achievement forms another very important link between your Citizens and those whom I as Lord Mayor of London have the honor to represent, and your good wishes are cordially reciprocated."

Officers of various commercial organizations as well as Western Union and Association of Western Union Employees' officials and numerous press representatives were present at the ceremony. The former included Judson F. Stone, President of the Chicago Association of Commerce, John J. Stream, President of the Chicago Board of Trade, John M. Glann, Secretary of the Illinois Manufacturers Assocaton, Harvey Hill, General Secretary of the Illinois Chamber of Commerce, all of whom sent and received greeting messages, E. K. Fleming, President of the Traffic Club, C. T. Atkinson, Secretary of the Chicago Stock Exchange, and Robert B. Beach, Business Manager of the Chicago Association of Commerce.

Telephone Lines of International to Girdle Globe

OFFICIAL Washington was interested a few days ago in the news of election of representatives of the National City Bank, All-America Cables, Berwind-White Coal Company and other big interests on the Board of Directors of the International Telephone and Telegraph Company, which is understood to be the moving spirit in a gigantic enterprise to consolidate telephonic communication systems throughout the world.

The Government is in possession of information indicating that these consolidations are being actively pressed in several countries on this side of the Atlantic and that some progress has been made in European countries, where for the most part telephone systems are under government ownership and control.

While considerable opposition has been met in European countries by the group which proposes consolidation, the attitude of Latin American Governments which operate their own telephone systems either in whole or in part is understood to be favorable to the project.

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CABLE CIPHER CODES

We have made the subject of cable cipher codes a study for over forty years. There are many hundreds of codes on the market that have been offered to the public at one time or another. We are familiar with the most prominent of them. This publication is headquarters for all cable codes. Many telegraph managers direct their inquiries for information on the subject of codes to the publisher of a particular code, who usually answers that he never heard of the book for which information is sought, but his own code will, no doubt, meet every requirement. As we deal in all codes without favoring any particular one, we are naturally headquarters for the different code books and are, therefore, in possession of information concerning most all of them. Bear these facts in mind when you have inquiries from your customers for codes, and direct your orders to

Telegraph and Telephone Age

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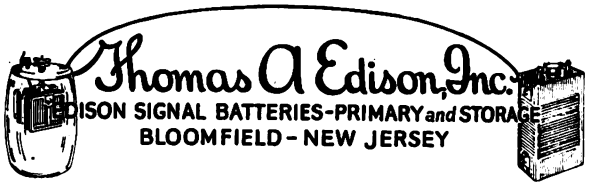
The Battery Must Be Reliable

The importance of the telephone and the telegraph is typified in the care that is being taken to manufacture reliable and efficient apparatus. But no matter how well the apparatus is constructed, it is of little value unless the battery supplying the energy is of similar reliability and efficiency, with resultant clear transmission and non-interruption of service.

Many progressive Signal Engineers believe that the primary battery best guarantees this reliability and efficiency. We shall be glad to have you write us regarding your own personal experiences or ask us questions regarding signal battery work.



ST. LOUIS Railway Exchange Bldg. CHICAGO Peoples Gas Bldg. SAN FRANCISCO 406 Balboa Bldg. 2001-36

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Candadian National Telegraphs

On January 9th, Chas. E. Davies, acting general manager of the Canadian National Telegraphs, addressed the Montreal Publicity Association with a large attendance, at their weekly luncheon in the Mount Royal Hotel, on the subject of "The Modern Telegraph." The theme of his talk was one of popularization of the telegraph, and its value to the commercial world. The subject had a direct bearing on publicity problems, and also touched on many points of educational value.

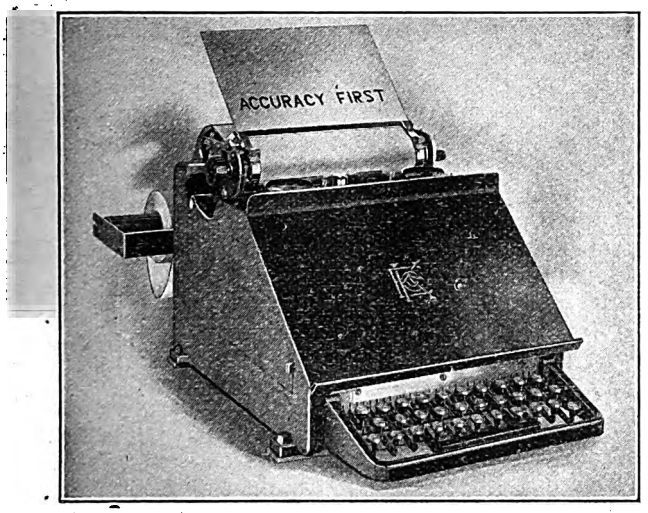
"Telegram for you" uttered by a telegraph messenger twenty years ago had an ominous sound to the person who opened the door, as it usually heralded bad news; but today it has lost its terrors, for the telegraph is a thing of everyday life, the harbinger of joy as well as of sorrow.

Not long ago, people knew the telegraph as a thing to be used only in matters of extreme urgency, but they did not understand that its urgency was also available for business. It is used now for sending Christmas and Easter greetings, loving messages on Mother's Day; to keep the home folks posted while away; to sell and to buy.

In business, a telegram compels attention. It is always put on the top of the executive's mail in the morning. It invariably takes precedence over letters, and many days are saved each year by the man who uses the wires. As an example of this, a business matter set forth in a letter is practically dead for perhaps twenty-four hours, until it reaches the recipient, and it is dead again between the time when an answer is written and received. A wire, on the other hand, decides the matter in a few hours. To further show that a telegram as compared with a letter in the time of the writer, his stenographer, office boy, stationery and postage, is little less than the tolls on a telegram.

Its "pulling power" is remarkable, and where letters failed, telegrams have collected accounts. As an instance, a fifty-three cent wire had sold ten thousand dollars worth of goods; a Toronto broker sold, in a very short time $98,000. of shares, through the telegraph, at a cost of one half of one per cent, by wiring his clients. A Philadelphia departmental store on opening wired 33,000 people, and the next day the police had to be employed to keep the crowds orderly, which were massed before the store. The cost of a telegram on this continent, including day and night letters, is computed to average sixty cents. Slides were shown containing pro-telegraph mottoes, such as: "Minutes make hours, hours make days, you cannot afford to waste them, telegraph, and you will be days ahead of your competitors. A letter invites attention, but a telegram compels it."

Turning to the technical side of the modern telegraph, its evolution was detailed since the earliest Morse invention, and each development illustrated by slides. It was interesting to behold the rapid advance of improvement in the type of apparatus employed in telegraphic communication. The telegraph office of today is a monument to the electrical engineers of the scientific world, and yet the task of providing the communication needs of our day, has only begun.



"SAY IT TO THE OTHER END IN WRITING."

After six years experience with Kleinschmidt Printers, and after testing every printer on the market, the largest user of printers now orders eight hundred (800) more Kleinschmidts.

The largest printer order ever placed rightfully belongs to the company that developed the first successful type bar printer.

The Kleinschmidt Telegraph Typewriter is quiet, simple, reliable and economical.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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The land line facilities and cable connections of the Canadian National Telegraphs were graphically shown on the screen, and illustrated unsurpassed telegraph service on this continent and with the whole world in general.

OBITUARY

Colorado Pioneer Who Helped Start Tramway Co. Dies

JAMES H. NICHOLS, one of the incorporators and original owners of the Denver Tramway company and a pioneer resident of Denver, died at San Francisco at the home of his daughter, Mrs. C. A. Van Scoy, on January 17th.

Mr. Nichols, during his residence in Denver, was one of the most prominent real estate dealers and business men of the city. He was prominently identified with all civic affairs of the city until he left for California in 1919.

Mr. Nichols was born at Chester, Ohio, January 19th, 1843. After attending the public schools there, he graduated from Dennison university at Granville, Ohio. At the outbreak of the Civil war he answered the first call for volunteer military telegraphers made by President Lincoln, and served throughout the war under Grant and McClelland.

In 1867 he came to Denver as an operator for the Western Union Telegraph Company. Two years later he was made manager of the company's office at Cheyenne. He served there until 1879, when he returned to Denver and engaged in the real estate business. Beside being one of the organizers of the Tramway company, he also helped to launch the Colorado branch of the American District Telegraph Company.

Mr. Nichols' entire fortune estimated at more than $500,000, was wiped out in the panic of 1893. He continued his old real estate business here until he moved to California in 1919 to live with his daughter. He was a charter member of Consistory No. 1 and also belonged to the Central Presbyterian church. During his business activities in Denver, Mr. Nichols was prominently identified with the chamber of commerce and other civic organizations.

He is survived by his wife, Mrs. Isabel R. Nichols, three daughters—Mrs. G. C. Collins and Mrs. A. N. Moody of Pasadena, and Mrs. Van Scoy—and two sons, Victor Hugh Nichols of Grand Rapids, Mich., and P. Harvey Nichols of Denver.

Mr. Nichols was operator for General Grant when General Lee surrendered at Appomattox Courthouse, and Mr. Nichols remarked that when he saw the Union generals rush toward the Confederate generals and embrace them, he knew that the Civil War had come to an end.

J. M. WOOTEN, aged sixty eight years, a well known Southern operator of Morristown, Tenn., died on January 10th. Mr. Wooten had made his home in Morristown for the greater part of his life, having worked for the Western Union Telegraph Company. Three months ago he started to work for the Postal Telegraph Cable Company.

A Telegraph Jubilee

THE Central Telegraph Office, London, is this month celebrating the jubilee of its occupancy of its present home in St. Martin's le Grand, where it was established in January, 1874. The first central telegraph station was established in 1850 by the Electric Telegraph Company in Founder's Court, Lothbury, opposite the Royal Exchange. This fine old hall, upon the tesselated floor of which were situated the public counter and administrative offices of the Company, was surrounded by two large galleries overlooking the main body of the building. In these galleries were placed the telegraph instruments. The term "gallery" persists to the present day.

In 1860 larger premises were built in Telegraph Street, E. C., and at the transfer and up to January, 1874, that building remained the Central Office. Expansion of business soon had its effect upon the limited space in the building. Accordingly it was decided to remove to the new Post Office in St. Martin's le Grand. At the outset the third floor was sufficient to accommodate the telegraph staff in their new quarters. At the present time almost the whole of the building known as G. P. O. West is occupied by telegraphs.

A year or two before the removal from Telegraph Street, the telegraph system had undergone an epoch-making development, for it was during the Franco-Prussian War that this system of communication was first used for newspaper purposes. Within a few years the number of Press telegrams increased enormously. In 1874 the number of wires at the Central Telegraph Office was 230. At the present time there are 785 sets of apparatus in use, providing for the working of approximately that number of line wires.

The telegraph staff have had some interesting experiences, as, for instance, when an irate gentleman wanted to know why a telegram which he had sent from his country house to a London theatre, "reserve me two stalls", was delivered textually as "reserve me two stables".

The present staff of the Central Telegraph Office numbers five thousand.

Creosote Bath Lengthens Life of Telephone Poles

ABOUT one-third of all poles placed by the Bell Telephone Companies are chestnut. Up to the present time, very few of these poles were treated with a wood preservative before they were set. The Bell System now has plans well under way for treating these poles, before they are placed in the ground.

The treatment consists of standing poles in an open tank of hot cresote oil for several hours, then quickly changing the bath to cold creosote so that condensing the steam in the wood cells will create a vacuum causing the wood to absorb the oil. A pole is treated up to about one foot above the ground line, which covers the entire section where rapid decay ordinarily occurs. This adds from ten to fifteen years to the life of a pole which would ordinarily last from ten to twenty years.

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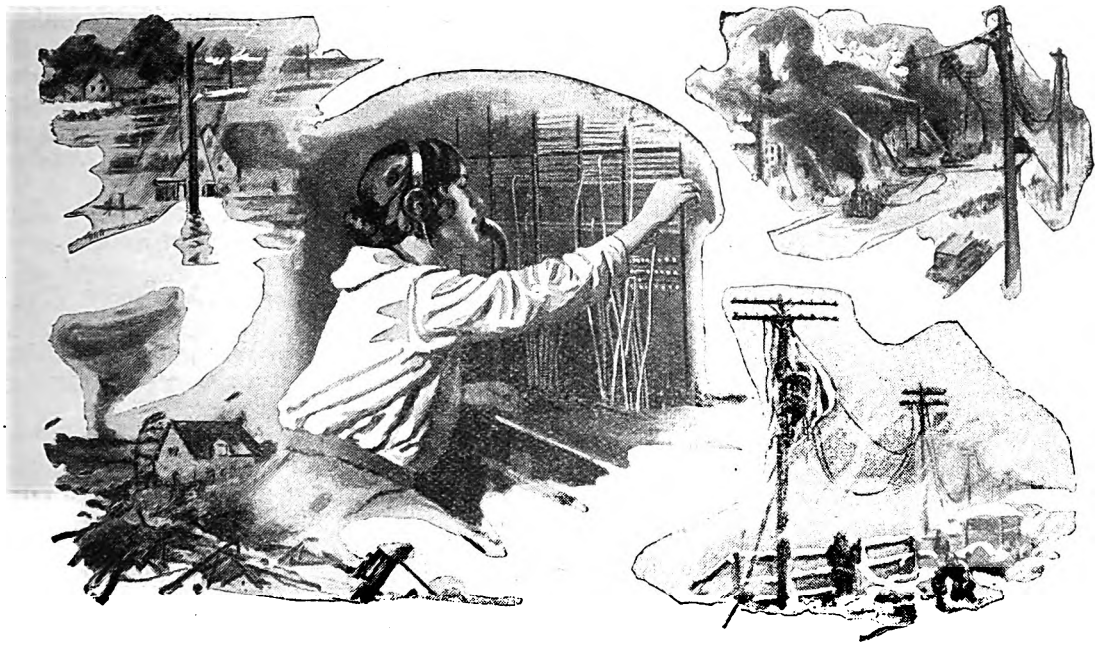

Priceless Service

Despite fire or storm or flood, a telephone operator sticks to her switchboard. A lineman risks life and limb that his wires may continue to vibrate with messages of business or social life. Other telephone employees forego comfort and even sacrifice health that the job may not be slighted.

True, the opportunity for these extremes of service has come to comparatively few; but they indicate the devotion to duty that prevails among the quarter-million telephone workers.

The mass of people called the public has come to take this type of service for granted and to use the telephone in its daily business and in emergencies, seldom realizing what it receives in human devotion to duty and what vast resources are drawn upon to restore service.

It is right that the public should receive this type of telephone service, that it should expect the employment of every practical improvement in the art, and should insist upon progress that keeps ahead of demand. Telephone users realize that dollars can never measure the value of many of their telephone calls. The public wants the service and, if it stops to think, cheerfully pays the moderate cost.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

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PERSONAL

CLARA MAE DANIEL, daughter of Mr. and Mrs. William Shipp Daniel of St. Louis, Mo., was married on January 19th to Richard Cloyd McFarland. Mr. and Mrs. McFarland will be at home, (2827 Minnesota Avenue,) to their friends after February 1st.

POSTAL TELEGRAPH-CABLE CO.

ANNOUNCEMENT was made on January 14th, by Clarence H. Mackay, President of the Commercial Cable Company, that John Goldhammer has been designated First Vice President, succeeding George Clapperton, deceased. Mr. Goldhammer was elected a Vice President, of the Company in September, 1922. It was also announced that Joseph J. Delehanty, who has been Assistant Traffic Manager for some time, succeeds to the post of Traffic Manager, an office which Mr. Clapperton held at the time of his death.

Mr. Goldhammer has been with the Commercial Cable Company for more than thirty years, having started as an office boy. He has had vast experience in the communication field, both in this country and abroad. For a number of years he was assistant to President Mackay, where he had opportunity to demonstrate his marked ability. His duties frequently have called him to Europe for negotiations with foreign Governments and companies.

Mr. Delehanty also started with the Company as a boy and his progress has been through the operating department. He was known as one ot the fastest and most accurate operators in the transatlantic service. At the present time, Mr. Delehanty is in Europe, inspecting the Company's stations, but he is expected to return to New York within the near future.

In making the announcement, President Mackay pointed out that the appointments were in line with the company policy of making promotions from within its own ranks. "It has always been the policy of The Mackay System to advance its men as rapidly as occasion permits", he said. "We believe that the American boy is the raw material out of which the world's greatest men may be produced and it is our constant endeavor to further the interests of this boy, confident that in doing so we are furthering our own national and corporate interests."

EDWARD REYNOLDS, vice president and general manager, and E. D. Thornburgh, advertising manager, left New York, on January 20th for Dayton, Ohio. At the Kiwanis Club dinner held there on January 22nd, Mr. Reynolds made a delightful speech, illustrated with the aid of motion pictures, on the cable recently laid to Europe by the Commercial Cable Company. From Dayton, Mr. Reynolds will proceed to Minneapolis to attend the annual meeting of the North American Telegraph Company. On his return he will visit Chicago and Detroit, arriving in New York about February 3rd.

C. A. Comstock, vice president, has left on a business trip to Boston. He expects to return within a few days.

Rufus Gould, supervisor of plant, is on his way to Texas, having left Atlanta. He is supervising the construction of a new line now being strung between Fort Worth and El Paso.

New York City

E. J. FINELLI, loop chief on the early night force was married on December 27th, to Miss Eunice Sena. The wedding which was well attended by members of main office force, was followed by a reception at the home of the bride. The young couple spent their honeymoon visiting Washington and Philadelphia.

Neil Flood, of Manager C. A. Coney's staff has returned after an illness of several weeks.

Arthur Fisher has succeeded N. Pastrof as Eastern traffic chief on the early night force, Mr. Pastrof having resigned.

R. E. Walsh, former Western traffic chief has been appointed assistant to General Traffic Chief V. F. Fiore.

John Ulla has relieved Clarence Phillips as loop chief. Mr. Phillips now is working in the capacity of Mux Mechanic, having acquired considerable experience on the machines while working on the all night force.

Managers Appointed

MISS ROSE THORNE, Streator, Ill.; W. O. Sager, Lorain, Ohio; E. Hildebrand, New Rochelle, N. Y.; C. Lucia, Norwich, Conn.; Jos. Colosimo, Medina, N. Y.; F. W. Krock, Huron, Ohio; W. B. Grubbs, Hopkinsville, Ky.; G. S. Middleworth, Visalia, Calif.

L. T. FREE, Buena Vista, Ga.; D. R. Sanford, Waynesboro, Ga.; G. T. Sibert, Fort Valley, Ga.; D. A. Stiffler, Lamar, Colo.; J. M. Wooten, Morristown, Tenn.; R. K. Thompson, Crawfordsville, Ind.; D. F. Finger, Potomac Yards, Va.

THE Postal telegraph office at Altoona, Pa. has been moved to one of the first floor storerooms of the Penn-Alto Hotel Building.

O. T. MOORE, manager, Postal Telegraph-Cable Company, Anderson, N. C., has been promoted to the managership of the office at Winston-Salem, N. C., which is the largest city in the state.

The Magnetic Club Elects Officers

THE annual meeting of the Magnetic Club was held in room 1010, 253 Broadway, on January 17th, the principal business being the election of officers for the year 1924. The ticket presented by the board of governors and which was ratified by the members, was as follows:

President, Edward Reynolds, Vice Presidents, John F. Skirrow, Curtis A. Comstock and Felix J. Kernan; Secretary William B. Dunn and Treasurer, Joseph J. Cardona.

For members of the board of governors, term expiring January 1926: E. A. Coney, J. J. McDermott, F. G. Payne and C. Shirley.

At the close of the election a resolution was adopted extending a vote of thanks to the retiring President for the "able and efficient manner in which

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he conducted the affairs of the club during his incumbency." In response, Mr. Daviet stated that he appreciated the resolution but that the success that had marked the affairs of the club during the two years in which he had held office was solely due to the splendid co-operation and support accorded by the various committees and that he was glad of the opportunity afforded to express his high regard for their work.

The report presented by the secretary gave the present membership as 495, a gain of 123 during the year, while that of the treasurer exhibited a balance of $307.64 on hand after payment of all expenses for the year.

The board of governors are determined that the banquets during 1924 shall surpass in interest and enjoyment all those which have gone before, special attention being devoted to the Spring dinner at which will be celebrated the fortieth anniversary of the Commercial Cable Company.

Commercial Cable Co.

ARTHUR SUNDERLAND who was at the Waterville, Ireland, station from 1891 to 1921; later as assistant superintendent at the London office, has been made superintendent of that office, in succession to the late John Wilkinson. Mr. Sunderland was born in London in 1875.

Reginald R. Colley of the station at Rockport, Mass. was on a visit to New York recently.

Mr. and Mrs. Daniel Morrison and son Donald, returned from a visit to Great Britain and left New York on January 20th for Los Angeles, and thence to Honolulu.

J. J. DELEHANTY, after a tour of the Company's British and Continental stations, left Southampton on the Steamship "Majestic" on January 23rd enroute to New York.

Commercial Pacific Cable Company

DANIEL MORRISON is now enroute to Honolulu, after an extended holiday.

Supervisor W. S. Fraser has been transferred from Honolulu to San Francisco and arrived at the latter place January 23rd.

Supervisor A. McDermid has been transferred from San Francisco to Manila and left San Francisco on January 24th.

E. Desnouee who is at present in France on sick leave is progressing favorably.

Telegraph School at Providence, R. I.

ANNOUNCEMENT has been made of the opening at Providence, R. I., of the Commercial Telegraph School, the object of which is to present courses of study in telegraphy which will qualify students to do work at the profession. Arrangements have been made so that advanced students will receive instruction under actual working conditions in the main operating department of the Western Union Telegraph Company. The new school is located at room 209, Tribune building.

THE WESTERN UNION TELEGRAPH CO.

Social Notes of the Testing and Regulating Department, New York

IN its customary manner, Testing and Regulating Assembly Number 78, Association of Western Union employees, entertained its new officers for 1924 at the annual dinner held at Stewarts Park Place dining rooms on January 17. In addition to the newly elected officers of the assembly, Messrs. James W. Burnett, President, C. H. Lawrence, Vice President and Thomas L. Flynn, Secretary-Treasurer (re-elected), the assemblage included Col. I. D. Hough, Division Traffic Superintendent, Metropolitan Division, George C. Gute, Testing and Regulating chief, New York and Morris L. Harner, Division Vice President of the association. John W. McMahon, recently appointed District Commercial Manager, Third District, formerly an Assistant Wire Chief and ex-president of Testing and Regulating Assembly No. 78 was toastmaster.

The appetizing menu carefully selected by Messrs. W. B. Hermance, as chairman of the arrangement committee assisted by F. C. Licari and T. C. Nettles surpassed in quality and diversity all previous occasions. There is manifestly, charm, interest and grace exemplified whenever this trio of connoisseurs put their magic touch to these affairs and the members of the assembly are gratified that their arrangement committee, not only possesses the austere characteristics which sometimes necessarily prevails during business contact, but which is always softened in preparing and promoting social intercourse. Mr. Hermance is Repeater Chief of the Metropolitan Testing and Regulating, but does not lack the virtues of a good fellow.

Colonel Hough as honor guest, spoke at length on his experience in Testing and Regulating work and pointed out how dependent the service is upon this department. He emphasized the fact that the company expected a flexible, quick and accurate service during the coming Democratic National Convention in New York, and while he knew that the Testing and Regulating always rendered this, he called the subject to the attention of the assemblage, in order that they can prepare for unusual demands and accredit themselves to the satisfaction of the company and the public. The Colonel appeared to enjoy the occasion as he related many pleasant and amusing facts of his pioneer days in the struggling Southwest. His attitude exemplifies the Democratic tendencies telegraph officials follow which has proved so profitable to the company as well as its employees.

Mr. Gute followed Colonel Hough and proved himself a regular fellow. Mr. Gute's dignified bearing is deceiving; he descended from the nobility and in statue resembles a military officer, but in business he possesses the fairness of Solomon. He too grew up in the telegraph service and understands its impediments. He entertained us with many tales of experience and his coming was appreciated.

Mr. Harner spoke at length of the prosperity of

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the telegraph company and the important part the association has played in this respect. As he is a member of this assembly and known so well to its members there is no need of reciting how welcome Mr. Harner is to the social affairs.

The new president of No. 78, Mr. Burnett, proved himself to be equal to the office. His only weakness as he confessed, occurred in Richmond, Virginia, many years ago; he called it "jumping at conclusions." The story is too long for repetition, but is sombre, weird and terrifying. Edgar Allen Poe could certainly do justice to the narrative because it has its setting in a distant cemetery, a dreary night, a grave-digger and a messenger boy. The latter was Mr. Burnett. However through Mr. Burnett, assurance was pledged Colonel Hough, and the Traffic Operating officials, the support of the Testing and Regulating and its unselfish endeavors to make the service exemplary.

W. Bassett also entertained, but his ultra Southern dialect was dimmed by a reference by Col. Hough, who a short time ago passed through the Testing and Regulating department with a handsome young lady showing her the various functions of the Traffic Service. Mr. Bassett being so obsessed and pre-occupied in his work as to snub the visitors. The toastmaster declined to accept his apology because he too comes from the sunny South where the tingle of skirts and the musical voice of a lady is paramount to all work—regardless.

Mr. Britt, a protege of the first Senator from Mississippi, Hon. John Sharp Williams, missed his vocation; he should have been an actor. His monologues and recitations depicting the political tolerations of the backwoods democracy, transcends the oratorical charm of the worthy Senator, himself.

Many others spoke or added to the occasion. The assemblage was particularly proud of its associate member, Fred Lightfoot who for many years was connected with the Texas Postal. Fred is the only telegrapher that ever had the audacity to order out a whole fire department and get away with it. His acrobatic daring is responsible for this stunt down in Arkansas. Fred being marooned or anchored to a sixty foot pole one day and not being discouraged enough to jump off, promptly sent in a fire alarm. The hook and ladder relieved him of his perilous predicament, but the judge added to it.

The affair terminated in a congenial manner with assurance to work together, play together and aim together for the betterment of the profession.

Those present were:

I. D. Hough, G. C. Gute, M. L. Harner, R. W. Bassett, J. A. McLaughlin, George Masel, S. C. Dodd, T. H. Muddell, T. C. Nettles, J. W. McMahon, J. W. Burnett, J. F. Nihen, M. D. St. John, W. B. Hermance, S. H. Jolly, S. J. Britt, A. S. Leopold, R. M. Christian, P. W. Miller, T. L. Flynn, F. G. Lightfoot, F. C. Licari, W. McGrath, J. H. Bleigh, P. Jacobs and E. J. Hudson.

Radio Corporation of America

Major-General J. G. Harbord, President, was on a business trip to Boston recently, accompanied by W. A. Winterbottom, manager of the traffic department.

L. MacConnach has been appointed secretary, replacing J. W. Elwood, who is now Vice-President of the newly organized Federal Telegraph Company of Delaware.

David Sarnoff, vice-president and general manager, delivered an address entitled "Radio and It's Meaning to the Farmer." on the occasion of the Missouri State Farmer's Week, at the University of Missouri, January 17th.

A new record was established during an experimental exhibition before the body of Missouri farmers, when Mr. Sarnoff picked up a telephone, got the Radio Corporation's station at San Francisco, and sent a radio message to the Iwaki station in Japan. Mr. Sarnoff received a reply one minute and forty-five seconds later, before the eyes of hundreds who packed the auditorium. Over 14,000 miles had been traversed.

Mr. Sarnoff predicted the transmission of photographs via radio telegraphy as the outstanding development for the coming year.

Pierre Boucheron, advertising manager, told an attentive group of young men at the East Side Y. M. C. A. Radio School, 153 East Eighty-Sixth Street, New York, on January 15th, of the unlimited opportunities in the radio business today for the radio experienced young man.

Taking his own case as an example, Mr. Boucheron explained how he passed through all the departments of the radio business until finally he became advertising manager for the Radio Corporation. "And I am only a common fellow; any one learning radio thoroughly now will have perhaps more opportunity for a good position in years to come than I had," but a man in order to make good must know radio thoroughly.

It was explained that there are two broad divisions of radio jobs; the first and the one requiring the most thorough training, is radio operating. A young man may take a course in radio operating and upon obtaining his Government license be assigned to a ship as his first job. Twelve years or so ago this happened to Mr. Boucheron, and for four years he sailed the seas, seeing about thirty-five different ports in all parts of the world. The educational and cultural value of this experience he holds invaluable.

Frank C. Long, an old time telegrapher and a member of the United States Military Telegraph Corps during the Civil War, died at Tampa, Fla. on January 16th. This leaves but ninety-seven survivors of the telegraph corps during the Civil War.

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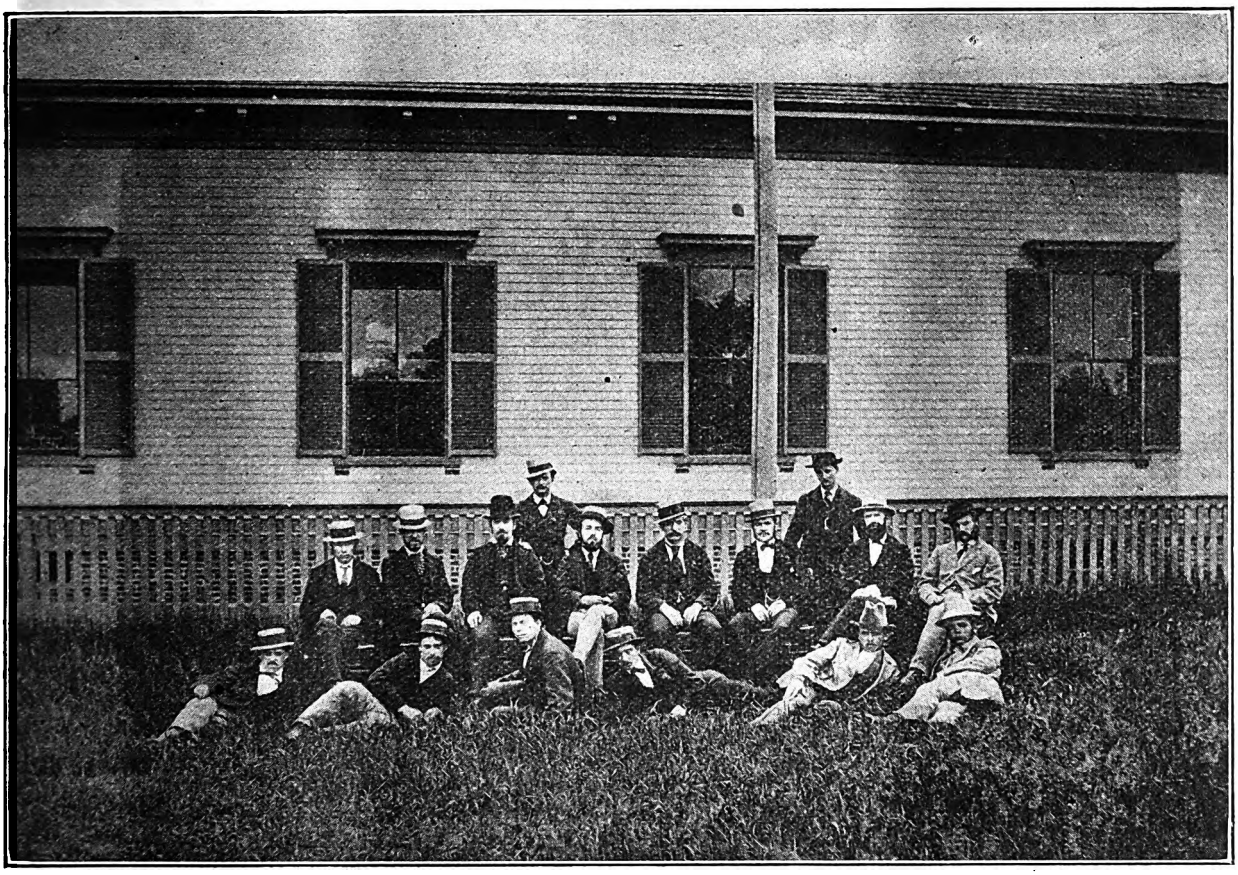
TRANSATLANTIC CABLE PIONEERS

THE grim reaper is fast making inroads on the little band of operators that came from Great Britain, and formed the pioneer staff of the Direct United States Cable Company at Rye Beach, N. H., in 1874.

Under the careful supervision and tutelage of George Gray Ward, the first superintendent of the New York, Boston and Rye Beach offices, the staff, many of them having no previous cable experience, excepting that obtained at the Siemens Brothers Works, Charlton, near London, England, and that of a cursory character, later developed to a state of proficiency that is kindly remembered by the cablers even to the present day, especially so before the advent of the typewriter for their splendid penmanship.



Standing, left to right—T. Blake, T. J. Wilmot. Seated, left to right—G. Clapperton, George Smith, James Brown (afterwards New York superintendent), William Matheson, William Quinn, James Stuart, Mr. Minstedt (Siemens Brothers' representative), W. J. Fraser. Foreground, left to right—A. F. Toovey, Edward Palmer, J. F. Fraser, J. C. Shaw, Fred Noad, Tom Bradley.

It is notable that from this little band of fifty years ago were selected individuals who were to make their mark in the cable world, the most distinguished being the lamented George G. Ward, whose memory is revered by every Direct Cable man. In 1884 he was appointed manager of the Commercial Cable Company, and later was invested with the title of vice-president and general manager.

George Clapperton, who passed away on January 11th, was the first New York superintendent of the Commercial Cable Company. After serving in this capacity with marked ability for sometime, he was promoted to the position of traffic manager, and first vice-president.

T. J. Wilmot was the first superintendent of the Boston office of the same company. Later he was transferred with the same title to the more important station at Waterville, County Kerry, Ireland. During his charge of this station he invented and perfected several devices, which added greatly to the speed and accuracy of cable working.

A. F. Toovey left the service to become clerk-in-charge of the French Cable Company, at that time located at North Eastham, Mass., but later under the superintendency of a New York Pioneer of the Direct Cable Company. The late Hugh Osborne, was removed to Orleans, Mass.

William Matheson joined the force of the Commercial Cable Company and is still in their service in New York.

W. J. Fraser succeeded George G. Ward as superintendent.

In 1880 J. C. Shaw (Jerry) was appointed clerk-

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in-charge of the Boston office.

J. F. Fraser, no relative of the other Fraser, after serving for several years as a thoroughly efficient assistant superintendent at Rye Beach, N. H., was promoted to the superintendency of the Halifax, N. S. office.

Mr. Minstedt, the Siemens Brothers representative, who manufactured the Direct cable, was offered the position of mechanician, but preferred to return to England.

Of the original staff there are six that we have absolute knowledge of their existence. Messrs. Quinn and Stuart dropped out of sight several years ago.

T. Gothorpe, was absent when the picture was taken. After serving the company for several years as mechanician he was transferred to Harbor Grace, N. F. During his period of superintendency he introduced successfully many inventions in cable working. It can readily be seen from the foregoing that several members of the original staff of the Direct Cable Company at Rye Beach, N. H. were destined to be leaders in the cable world, and have, as such, created a preeminence that will always make this staff one of importance and distinguished service.

Candler System Course.

W. H. CANDLER, inventor of the Candler System Course of Touch Typewriting and inventor of the course of exercise bearing his name is an old time telegrapher. Mr. Candler entered the telegraph service as manager of the Greenwood, Miss., office for the Western Union Telegraph Company in 1900. He next went to Charlotte, N. C., as operator, thence to Atlanta, Ga., where he did relay work for the Western Union Telegraph Company. He then went back to Charlotte, N. C. and later to Memphis. Mr. Candler resigned from the Western Union Telegraph Company in 1907 and engaged in press work until 1911 when he originated the Candler System, and has been engaged in that work ever since. Practically 30,000 operators in all parts of the English speaking world have been benefitted by the Candler System Course for telegraphers. Mr. Candler was born at Webster, N. C., October 17th, 1884, and his friends unite in the hope that he will live many years to continue his excellent work in behalf of the telegraph profession.

Principles and Practice of Telephony

THERE is a growing demand for a book covering the telephone situation and that demand has been admirably filled by J. G. Mitchell, the well known telephone engineer, who has just published, through the McGraw Hill Book Company, "Principles and Practice of Telephony" in five volumes, sold separately at $2.50 per volume.

A practical series, consisting of five volumes, intended to place before men in contact with the telephone business a means of acquiring knowledge of the principles underlying the technical side of telephony.

VOLUME I.—Principles and Apparatus.
VOLUME II.—Circuit Elements and Power Plants.
VOLUME III.—Toll Equipment, Traffic and Trunking.
VOLUME IV.—Circuit Refinements and Mechanical Switching.
VOLUME V.—Mechanical-Manual Switching.

This book covers the telephone in its entirety and every progressive electrical engineer ought to possess a copy. Make your remittance to Telegraph and Telephone Age, 253 Broadway, New York, and all orders will be filled the same day they are received.

Teaching French by Wireless

A SUCCESSFUL demonstration of the possibilities of broadcasting as an educational medium was recently given by 2LO, at University College. The demonstration was postponed, when, owing to an internal defect in the receiving apparatus, signals could not be clearly heard. The audience, as on the first occasion, consisted of educationists attending the Conference of Educational Associations. The instructors spoke from the British Broadcasting studio in Savoy-hill. The demonstration included an address by Mr. Allan S. Walker, on St. Paul's, with lantern slides and instruction in French pronunciation by M. Stephan.

Slow Telegraph Service in England

THE Association of British Chambers of Commerce has arranged for a conference of delegates to be held at Birmingham to discuss the many various alleged failings of the postal and telegraph services. Branch post offices in shops which open late and close early are often closed for an hour in the middle of the day as well as on early closing days, so that in London it may be necessary to make a journey of a mile in order to send a telegram. Even the larger offices have restricted hours of business which, "combined with the high cost of telegraphing and the slowness in delivery," make for diminished receipts.

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CONTENTS

PAGE

The Romance and History of the Electric Telegraph..... 76
Types of Radio Receivers. By A. K. Phillippi..... 80
Lincoln as I Knew Him. By David Homer Bates..... 81
A Pen Picture or Two. By R. W. Ledwith. Monopoly in Radio. Glass as an Insulating Material..... 82
Important New Cable Development. By Vice-president Frank B. Jewett.... 83
Radio Extends Help to Railroads and News Associations..... 84
Making Europe Part of United States Radio Audience. By W. W. Rodgers.. 85
Noiseless Merges with Remington. E. H. Hogshead. Automatic Telegraph Company Receiver Asked..... 86
Ship Radio vs. Broadcasting. By Chas. J. Pannill..... 87
Editorial Comment.—International Telephone Trust. Use of Telegraph Doubles in Year. London-Paris Direct Cable. Direct Cable Service with the French Public. Edison's Birthplace Gets Electric Lights..... 88
Railroad—Telegraph and Telephone Section of the American Railway Association. Train Control by Radio. All America Cables. Canadian National Telegraphs..... 91
The First Telephones in Canada..... 92
Surprise Party and Greatly Surprised Husbands. Phototelegraphy. Obituary. A Correction..... 93
Minneapolis Western Union Telegraph Company Messenger's Vocational Training Typewriting Class..... 94
Personal. Postal Telegraph-Cable Company. Commercial Pacific Cable Company. Wireless for Lonely Operators. Dinner of the Static Club. Telegraph and Telephone Materials for China..... 96
Western Union Telegraph Company..... 97
International Radio Regulations..... 98

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The Romance and History of the Electric Telegraph

A. H. ROBERTS is contributing a very valuable historical article on the Romance and History of the Electric Telegraph in the Post Office Electrical Engineers' Journal published in London. We herewith print part three as it appears in that journal:

Having proved that the direction of the magnetic force was tangential to the wire, Ampere and Arago proceeded to increase the deflection of the magnetic needle by twisting the insulated conductor into a spiral coil, and in this manner they obtained a sufficiently strong magnetic field to attract iron filings to the coil and to magnetize a steel bar placed within its hollow centre. All this, and much more on the theoretical side, was done in the short space of a week. Never before nor since has any science progressed with such rapidity in so short a period. Franklin and his co-workers had previously communicated magnetism to small bars of steel by the discharge of a battery of Leyden Jars, and the employment of a similar battery to reverse or destroy the polarity of a magnet was also known.

Following on his experiments with the magnetic needle, the coil of wire and voltaic battery, Ampere, adopting a suggestion made by La Place, proposed the use of this combination for the purpose of telegraphing, but as the system was to include a separate wire for each letter of the alphabet and a current of considerable strength was required to operate the magnetic needles the method cannot be considered a practical solution of the problem. It was not until 1824, when Schweigger introduced his "multiplier" coil, which was an extension of Ampere's spiral, that a sufficiently sensitive instrument was made available. Schweigger wound a large number of turns of insulated wire round a frame enclosing a magnetic needle and, by that device, so greatly increased the delicacy of the instrument that the needle was strongly deflected by a comparatively weak current. This arrangement formed the basis of the galvanometer and from the time of its introduction the electro-magnetic telegraph was rendered possible, but some years elapsed before the principal was successfully applied to that purpose.

Fechner, of Leipsic, is stated, by some authors, to have suggested, in 1822, the use of two wires and a single magnetic needle, which, by deflection to the right or left, could be used to signal the letters of the alphabet in accordance with a prearranged code, but that at the time the method could not be tested as a sufficiently constant battery was not available. If anything more than the bare idea of the possibility of such a plan existed in Fechner's mind, it is remarkable that he did not develop the system. The production of better batteries was occupying the attention of many capable electricians and a successful issue was only a matter of time. In his Handbook of Galvanism, which was published in 1829, Fechner proposed using 24 wires for a telegraph circuit between Leipsic and Dresden.

The next notable advance to the progress of telegraphy was:—

The discovery of the electro-magnet.—William Sturgeon, of the Royal Military Academy at Woolwich, made the notable discovery, in 1825, that when a bundle of soft iron wires was surrounded by a coil through which a current was flowing the iron became intensely magnetized, and that on stopping the current the magnetic effect also ceased. To bring the poles of the electro-magnet into the same plane, Sturgeon bent the iron into the shape of a horseshoe. The iron was varnished to insulate the coils of bare conducting wire which were wound spirally round it.

This discovery aroused great interest, and although the apparatus used to demonstrate the effect was somewhat crude, it was at once recognized that important developments would soon follow the introduction of such a ready means of producing and releasing magnetic action. Sturgeon was a distinguished worker in the scientific world who did much to stimulate the growth of knowledge, and especially of electricity in this country.

The electro-magnet was perfected in America by a professor of Mathematics at Albany Academy, named Joseph Henry. He applied the principle of Schweigger's multiplier and by insulating the conducting wire with silk was enabled to place the spirals of wire close together and to wind layer on layer in order to increase the magnetic strength at the poles. At first, Henry followed Sturgeon's plan of covering the whole of the iron with windings of the conductor, but it was found that the central part of the iron did not require to be covered, as the magnetic effect at the poles was not thereby increased and that the current passing through the conductor was unnecessarily weakened by the ineffective turns of wire, the practice was discontinued.

That Henry produced very efficient electro-magnets may be judged from the fact that in 1831 he exhibited a magnet that supported a weight of over a ton.

Professor Henry's researches into the laws of electro-magnetism placed him in the front rank of scientific investigators and his memory is honored by the unit of inductance being named after him, thus continuing the commendable practice of associating the electrical units with the names of distinguished electricians.

We now reach what may conveniently be termed the second stage of the electric telegraph. So far, the systems referred to were chiefly operated by frictional electricity, but from this time onward voltaic electricity was generally adopted as the actuating medium.

The first electro-magnetic telegraph was known as:—

Schilling's Telegraph.—The apparatus consisted of five horizontal magnetic needles surrounded by coils of wire. The signals were read from combinations of deflections to right and left. For sending purposes, a kind of piano keyboard was used. The call

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signal was provided by a bell, driven by clockwork, the action being started by the fall of a metal ball which was released when one of the needles was deflected. This instrument was invented in 1830, and it is said that models were inspected by the Emperor Alexander of Russia, in April of that year, and at a later date by the Emperor Nicholas, who witnessed experiments performed through a great length of wire. Shortly afterwards, Schilling left Russia for China, but on his return in 1832 he continued his telegraphic experiments and simplified the instruments.

In some accounts of Schilling's inventions, reference is made to an instrument comprising thirty-six needles, and it is possible that he devised such an instrument at an earlier date. It is known that Schilling was well acquainted with Sommering's method and he probably followed the plan of using a separate wire for each signal in the earlier stages of his investigations.

In September, 1835, Baron Schilling exhibited at Bonn a single needle instrument on which the signals were read by a code of deflections, to right or left, representing the separate letters of the alphabet. At that meeting, Professor Muncke of Heidelberg University, presided, and was so charmed with Schilling's apparatus that he at once decided to obtain a set to illustrate his own lectures. The realization of this desire was indirectly responsible for the introduction of the first practical telegraph to this country, as will be related in due course. It is to be deplored that Baron Schilling, who was a Russian Counsellor of State, died before he had an opportunity of placing his apparatus in actual service.

For some years after Ronalds was treated with such scant courtesy in official quarters, there is no evidence that the electricians of this country pursued the subject of the development of the electric telegraph with any marked degree of enthusiasm. It is true that Dr. Ritchie, of Edinburgh, exhibited a model to illustrate the working of Ampere's telegraph at the Royal Institution and that Alexander, at a later date, gave demonstrations in London and Edinburgh of a telegraph in which small screens were attached to vertical needles in such a manner as to normally obscure a printed letter of the alphabet. When any needle was deflected under the influence of a current, the letter was exposed to view. As a separate wire was necessary for each symbol, the system was suitable only for laboratory use.

Gauss and Weber's System.—With the discovery made by Faraday, in 1831, that currents may be induced in a closed circuit by the relative movement of a magnet and a coil of wire, another possible means of transmitting signals by electricity was brought to light.

The first application of the method to that purpose is due to Gauss and Weber, who, in 1833, erected a double line of copper wires one and a quarter miles in length between the Physical Cabinet and the Observatory at Gottingen. At first they employed voltaic electricity and the line was used for the purpose of research work in connection with the laws of current strength. At a later date the magneto-electric system was adopted for the regulation of clocks and other scientific purposes, but the inventors were also alive to the fact that the apparatus was applicable to ordinary telegraphic transmission and, with the object of proving this, experiments were undertaken and short sentences exchanged over the wires with complete success.

The lines were in use for 11 years and were finally destroyed by lightning in 1844.

Gauss and Weber's telegraph is notable for two important reasons. Firstly, because a commutator was used for reversing the direction of the current—an entirely new idea at that time—and secondly on account of the introduction of a code of signs which permitted a letter of the alphabet or any single numeral to be signalled by four or less right and left deflections of the needle. This ingenious code may be represented as follows:—

It will be seen that the signals for C and K are alike, and also F and V, while J. Q, X, and Y are omitted. With a five unit alphabet all the letters could be included and a separate formation given to each.

It will, perhaps, be interesting to explain the working of the apparatus as described in Sabine's "Electric Telegraph."

At the sending station, two or three large permanent magnets, each weighing 25 lbs., were vertically supported with their similar poles in the same direction, by a stool-like structure.

Over the end of the upper pole, a loosely fitting wooden bobbin, which in the ultimate form of the instrument was wound with 7000 turns of insulated copper wire, was formed to slide easily over the poles of the magnets. A pair of handles, were fixed to the bobbin on opposite sides to enable it to be lifted with both hands, from its position of rest on the stool, to the top of the projecting magnet. On rapidly raising the bobbin, an induced current was generated in one direction, passing out to line and through the receiving instrument. On lowering the bobbin, a current was generated in the opposite direction. The ends of the bobbin were connected to line through the commutator, which was brought into use when more than one deflection in the same direction was required to be given to the receiving magnet. If the raising of the bobbin caused a deflection to the right, and it was necessary for the succeeding deflection to be in the same direction, the commutator was operated between the raising and lowering of the bobbin.

The receiving instrument consisted of large coils of insulated copper wire, wound on a copper frame, the free ends being connected to the line wires. A steel permanent magnet, 18 inches in length, was suspended inside the coils of wire by a number of silk fibres supported by an attachment fixed to the ceiling of the room.

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It will be readily understood that such a ponderous needle would only be deflected through a small angle and its movements would not be easily discerned by the naked eye. To assist the operator, therefore, a mirror was attached to the suspension of the magnet and the signals were read from the reflected figure of a horizontal scale by means of a telescope fixed at a distance of 10 or 12 feet from the mirror.

The copper frame round the needle was introduced to make the instrument dead-beat, the checking action of a metallic bobbin in the vicinity of an oscillating needle having been discovered by Arago and described by Sir William Snow Harris in 1831.

Whatever merits this sytem may have possessed as an aid to muscular development, it is quite clear that 8 hours' duty on the "key" would be a task not to be lightly undertaken.

Although the receiving apparatus may appear to be extremely cumbersome and crude as compared with the instruments in general use to-day, it is interesting to note the many points of similarity in principle with that very delicate instrument, the mirror galvanometer, which was devised by Lord Kelvin for the purpose of signalling through long submarine cables.

Following up the idea of its evident suitability for telegraphic purposes, but being unable to devote the time necessary to the improvement of the apparatus, Gauss applied to Professor Steinheil, of Munich, for assistance in carrying out the necessary research work to render the system suitable for practical use. Steinheil took up the task with such enthusiasm and made so many improvements that his ultimate production may be almost said to constitute a separate invention, for not only did he increase the rapidity of transmission by using mechanical rotation as a means of generating the induced currents, but he also invented an effective recorder which printed the signals on a moving band of paper kept in motion by the action of a train of clockwork. Messages were sent by this system at a speed of 6.13 words per minute. In another form, by substituting small hammers for the ink tubes of the recorder, an acoustic telegraph was constructed, the two hammers each striking a bell of glass or metal, which were of different tones. This apparatus was working in July, 1837, through a length of 12 miles of wire with an intermediate as well as terminal stations in circuit.

It is worthy of mention that by the arrangement of the commutator springs contact with the line was only permitted when the current was at its maximum strength. The same principle is to-day adopted in the receiving distributor plate of the Baudot multiplex.

Up to this time. it was assumed that frictional electricity and voltaic (or galvanic) electricity were different in their essential characteristics, and although, as has already been shown. the earth return had been freely used for the transmission of frictional electricity, a complete metallic circuit had invariably been utilized for voltaic electricity, until Steinheil, by experiments conducted on the Nuremburg and Fuerther Railway for the purpose of endeavoring to use the railway lines for telegraphic purposes, discovered that the earth return could also be applied to voltaic and magneto-electric systems, thereby reducing the wire necessary to one half its former length. In proof of this Steinheil removed the return wires and connected his apparatus to plates of metal buried in the earth without decreasing the efficiency of the working.

So far, we have only been considering those systems which were used for private or semi-public purposes, for the regulation of clocks or for transmitting messages between different departments of the State. None of these installations were available for the conveyance of public telegrams, although Steinheil's telegraph was well adapted to the purpose if used within a limited distance. We now come to the commencement of what may be described as the era of public telegraphs.

In the month of March, 1836, William Fothergill Cooke, who was formerly a military officer in India and had resigned his commission on account of ill-health, was engaged in the study of anatomy at Heidelburg in connection with his employment as an anatomical modeller. On or about March 6th, 1836, he happened to be attending a lecture by Professor Muncke, who exhibited the effect of electric currents in deflecting a magnetic needle at the end of a length of wire. The apparatus consisted of two galvanometers, each fitted with a single magnetic needle and two batteries, presumably voltaic piles; the two instruments, which were duplicates of Baron Schilling's telegraph, were installed in separate rooms and connected together by copper wires. Only two elementary signals were transmitted; they were opposite sides of a cardboard disc attached to a straw supported by a silk thread which also carried a magnetic needle suspended inside a coil of wire by means of a silk thread.

When the distant battery was connected to the line wires and the free ends were dipped into small mercury cups in which the galvanometer windings terminated, a deflection of the needle resulted and the card was turned exposing either the cross or the line to view according to the direction of the current.

This elementary experiment so strongly impressed Mr. Cooke with its possibilities of extension in connection with the transmission of intelligence by telegraph that he at once entirely abandoned his former pursuits and with keen imagination and indomitable perseverance applied all his energies to the practical realization of his ideas.

Knowing little or nothing of electrical matters, beyond what has just been described, Cooke imposed upon himself the task of producing a really efficient telegraph system which could be applied to everyday uses. Truly Fortune favors the bold, for the laboratory top of eminent scientific authorities was transformed by this new-comer into a complete telegraph apparatus in the course of a few days.

Within three weeks of witnessing Professor Muncke's demonstration, Cooke had completed the construction of his first electric telegraph, which consisted of three magnetized needles worked by six wires. The sending portion of the instrument com-

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prised a series of keys to be depressed in a given order for the formation of the 26 separate signals which could be transmitted, but his greatest triumph was in solving the difficulty of leaving the instrument in a position to receive signals immediately after the sending of a message was completed. By this device the apparatus was capable of being used for sending and receiving without any alteration in the connections and the operator at the outgoing office could also read the signals he was transmitting to line. In addition to these remarkable advances on previous practice, Cooke had further invented a "Detector" for testing the line and apparatus in the case of faults occurring on the system. Before the end of the month, a clockwork alarm was added to the instrument, which then formed a complete and practical telegraph. The alarm was set in motion by means of an electro-magnet, the armature of which, on being actuated, removed a detent and allowed the clockwork to ring a bell. Not content with the phenomenal speed with which his first ideas had materialized, Cooke also commenced the construction of a mechanical telegraph, in which a dial, revolved by clockwork, was stopped at any part of its revolution, when the selected signal on the dial was exhibited opposite to an aperture in a fixed plate. It will be seen that this is very similar to Ronalds's telegraph, but Cooke adopted voltaic electricity for operating purposes, whereas Ronalds used frictional electricity, which was not so suitable for telegraphic transmission. There is no suggestion that Cooke adopted Ronalds' dial; in fact the evidence points to his having invented it quite independently. The idea of a mechanical telegraph which would require a smaller number of wires for its operation than the three needle system occurred to Cooke on March 17, 1836. He was travelling from Heidelburg to Frankfort and happened to be reading Mrs. Somerville's work on the Physical Sciences. While doing so, the thought that a simple telegraph on the clockwork dial principle would possess many advantages over the magnetic needle method flashed across his mind. To think was to act and he at once set about the work of devising a new instrument.

Almost the only piece of mechanism with which he was at the time familiar was contained in a musical snuff-box. He immediately used the model of the musical-box barrel as the basis of a telegraph instrument and so well did he succeed that within six weeks of the date of Professor Muncke's lecture, Cooke was on his way to London for the purpose of making a mechanical telegraph from drawings which he had then prepared. So certain was he that the magnetic needle system could not compete with his later invention that he did not trouble to carry his needle instruments and models with him, but left them with other personal property in the care of his relatives at Berne. On reaching London, Cooke worked almost night and day on the construction of his apparatus, which he describes as follows:—

"It will be found that my earliest mechanism closely resembled that of a musical snuff-box. Pressure on keys completed the electric circuit, which magnetized the temporary magnet; which attracted the tail end of the detent, thereby drawing its upper end out of the train of wheels and allowing the mechanism to move by its own maintaining power, till the intervention of an appropriate pin upon the cylinder or barrel struck up the key, broke the circuit, caused the magnetism of the temporary magnet to cease and therefore put an end to the attraction of the tail end of the detent; and thus allowed the reacting spring to replace the detent in its resting position, and by so placing it to stop the mechanism, at the time when the revolving dial was presenting before an opening in the frame of the apparatus at each terminus, the requisite letter, figure or symbol."

During the months of June and July, 1836, Cooke occupied his leisure moments by drawing up a pamphlet or sketch of "Plans for establishing on the most extensive scale, and at trifling expense, a rapid telegraphic communication for political, commercial and private purposes, especially in connection with the extended lines of railroads now in progress between the principal cities of the Kingdom, through the means of electro-magnetism." After alluding to the many advantages of national importance which such a system would possess, the author discusses the method to be adopted to keep the underground line wires in good order.

To form testing points at short intervals, it was proposed to take branches off the main lines opposite to turnpikes on the public roads and at station houses on railways. The testing instrument was the Detector, which consisted of a magnetic compress needle fittted inside a coil of wire. The anticipated causes of faults were a gradual decomposition of the metal after burial for many years and the actual fracture of the conductor. What proved to be the most frequent cause of difficulty, viz., the failure of the insulation, was not mentioned, as it was thought the laying of the wires in separate grooves formed in the surface of strips of baked wood, covered by a thin wood capping and placed in semi-circular earthenware troughs in which the space between the wood and the trough was filled with waterproof cement would be a satisfactory and durable arrangement for underground work. Needless to say, experience proved the contrary to be the case, for the insulation soon broke down under the ordeal of practical trial.

(To be continued)

Torrid

A CONTEMPORARY relates that a redheaded Irish boy once applied for a position in a messenger office. The manager, after hiring him, sent him on an errand in one of the most fashionable districts. Half an hour later the manager was called to the phone and the following conversation took place:

"Have you a red-headed boy working for you?"

"Well this is the janitor at the Oakland Apartments, where your boy came to deliver a message. He insisted on coming in the front way and was so persistent that I was forced to draw a gun."

"Good heavens! You didn't shoot him, did you?"

"No. but I want my gun back."

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Types of Radio Receivers

By A. K. Phillippi, *Radio Engineer, Westinghouse Electric and Mfg. Company.*

The radio columns of the daily papers are filled with questions asking for possible results from certain receiving sets; whether they are good for 100 miles or a thousand, whether they will get this station or that, and a host of other details. It is evident that a short description of the different types of receivers and what may be expected of each will be appropriate, and will enable many to make a better selection which will more adequately meet the individual's needs.

A radio receiving set is an instrument which, when connected to an antenna, either of the elevated wire or loop type, is capable of converting the high frequency ether or wireless waves into air or sound waves, thus enabling the listener to hear speeches, broadcast programs, or telegraphy.

There are many types of Radio receivers, varying in sensitivity, selectivity, price and ease of operation.

The crystal receiver is the type most commonly used and the least expensive. This consists of a tuning coil and a crystal detector. Some of these have sharp tuning, or are more selective, while others have broad tuning. Sharp tuning is to be preferred, of course, as it helps to eliminate stations to which one does not wish to listen. The range of the crystal set is small, and on the average it is capable only of receiving signals within a maximum of 50 miles from the broadcasting station; this range depends entirely on the power of the transmitting station, the size of antenna and the sensitivity of crystal. With this type of instrument the music and other programs are almost an exact reproduction of that delivered into the transmitter, as very little distortion occurs. It is used near a broadcasting station and requires a large antenna for best results. Head phones must be used with this set. Receivers of this class are gradually losing their popularity, for, as the owner becomes most interested in radio, he feels hampered with only a crystal set and wishes to reach farther out into ether for more distant stations.

Vacuum Tube Receivers—The Vacuum tube receiver consists of practically the same apparatus as the crystal receiver, except that a vacuum tube is used instead of a crystal for a detector. This set has a distinct advantage over the crystal set in as much as the detector remains adjusted once it is set, while the crystal requires careful adjustment and is easily jarred from a sensitive position. Another advantage of the vacuum set is that it is more sensitive than the crystal. Its sensitivity is, however, still limited, and head phones must be used.

Detector Amplifier Receivers—This instrument is one in which the signals are detected by either a crystal or a vacuum tube. The signals are then strengthened by means of one or more stages of vacuum tube amplification, and may be built up to such an extent as to permit the use of a loud speaker.

Regenerative Receivers—By means of the Armstrong or regenerative circuit, amplification and detection with a single tube may be obtained in a receiver, which will give great sensitivity for distant signals. This set differes from others in that a regenerator or tickler coil is used and its function is to build up or amplify the detected signal. By the use of this instrument very weak signals may be heard. This set requires a little more careful adjustment than the other receivers mentioned.

Care should be taken in operating it to use its good qualities and not abuse them. With a little experience the operator will find that when the tickler or regenerator knob is turned to a certain place, the signals received are clear and strong. This is the point of maximum regeneration and by going past this point the sound becomes mushy. This mushiness indicates that the maximum regeneration point has been passed and that the receiver is oscillating. This not only destroys the quality of the signal, but by radiating from the antenna a certain amount of energy, interferes with the neighbor's proper reception of the signal. This missuse has caused considerable unjust criticism of this type of receiver.

The regenerative loud speaking receiver combines the good qualities of the detector amplifier and the regenerative receiver, making possible the amplification of weaker distant signals to such an extent that the volume furnished is ample to operate a loud speaking device. One of the advantages offered by this instrument is that a small antenna may be used with no appreciable decrease in signal strength and the selectivity is increased, thus making it possible to tune out more easily the interfering stations.

Radio Frequency Receivers—As this type of instrument, which is quite new to the majority of radio fans, can be used on a loop or short antenna it has helped fill the need for a set that can be used in a congested district such as in apartment houses or in places where the homes are so close together as to make it almost impossible to erect an antenna. By using radio frequency amplification ahead of the detector tube, the radio waves are amplified before they are detected. Two or more stages of radio frequency are equal to regeneration, which means that to get the same results, one must have more tubes and batteries to operate this type. Instruments of this nature have been designed in cabinets which can be moved about the room with the same ease as a phonograph cabinet. The cabinets contain the complete radio set, loop antenna, and batteries for both filament and plate. It is thus possible to have radio reproduction of concerts in any room of the house without having to bother with the antenna and ground.

When it is desirable to receive radio programs with sufficient strength to fill a large room, or small auditorium, a power amplifier becomes necessary. This set is generally combined with a loud speaker of approved design and the volume brought up to such an extent that large audiences are entertained by musical programs and speeches delivered to the transmitter many miles away.

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Lincoln as I Knew Him

By David Homer Bates.

Author of "Lincoln in the Telegraph Office

The pedigree of some of the so-called Lincoln stories may be likened to the case of the little German girl who went to school for the first time. What is your name her teacher asked "Le-ena" the child answered. "But what is your last name" Dot iss my last name, "Dot iss always my name." "But what is your father's name" said the teacher. "I never hat any fadder." "Well, what is your mother's name." "I never hat any mutter, I vass born off my grandmutter."

So, it seems probable that many so-called Lincoln stories were in fact current in the days of his grandmother. Some of them have the Kentucky flavor, particularly the one he disclaimed which had to do with the kind of whiskey which General Grant was said to have used with too much freedom. Some one said Mr. Lincoln proposed to distribute a supply of the same brand of whiskey to other Generals in the army who were not so successful as Grant had been. I heard Mr. Lincoln disclaim this comment.

It was my good fortune to have met Mr. Lincoln nearly every day during the four years of the civil war from April, 1861, until April 14, 1865, the day of his assassination. Immediately after Sumter was fired on Secretary of War Cameron appointed Thomas A. Scott, General Manager of Military Railroads and Telegraphs and one of his first acts was to telegraph to Andrew Carnegie, then Superintendent of the Pennsylvania Railroad at Pittsburgh for operators. Mr. Carnegie selected four, myself among the number, and that quartette was the nucleus of the United States Military Telegraph Corps at one time numbering 1500. Now, 1924, reduced by death to less than 100. When we four young operators entered the War Department, Mr. Lincoln was in the Chief Clerk's room next the telegraph office, and through the open door we could see him in conversation with Secretary Cameron and General Winfield Scott. All three were over six feet tall and at the moment the Mexican hero's massive form and bright uniform made a magnificent presence. Mr. Lincoln's homely appearance was not at first attractive, but as during the next succeeding four years I saw the great man almost daily under the varying conditions of anxious stress and alternate relaxation I came to think him, while of course not beautiful, certainly very attractive and lovable. It was his custom to visit the telegraph office several times each day to receive the latest news from the front. On many such occasions in the intervals of waiting for the translation of cipher dispatches, he would fill up the time by telling stories, reading aloud from a pocket Shakspeare he usually carried, or from the quaintly humorous articles of Petroleum V. Nasby from "Confedrit Cross Roads," or Orpheus C. Kerr's absured reports of military operations near Mackerilville. As a rule his funny stories were introduced into the conversation to illustrate some special point or clinch an argument. At other times he would repeat a story apparently for its mere humor and to pass away the time while waiting for news from the front. While we youngsters did not particularly notice it then it is now our settled belief that his chief purpose at such times was to lead his mind away from the awful incidents of the war that were ever present with him—the bloody battles, the frequent execution of deserters, the mistakes and jealousies of some of his generals, the criticisms of the daily press, frequently unjust and often quite disloyal, so we can now look back over the stretch of years and realize something of the relief to his tired body and soul, which the repetition of humorous and some times silly stories brought.

For instance, in July, 1864, when General Jubal Early with 20,000 men from General Lee's army appeared before the outer defenses of Washington, Mr. Lincoln visited the front at Fort Stevens within sight of the enemy and returning to the War Department, he described to us cipher operators who were alone in the telegraph office some of the incidents of the skirmish that had just taken place and made a plan of the forts which my comrade A. B. Chandler retained. On our part we were really frightened by the fact that the rebels were just outside the City and the government officials and the people generally were greatly alarmed, but Mr. Lincoln himself did not show the slightest trepidation, which seemed to us a strange thing. On the contrary he told us he had lately heard of two new inventions that had interested him both having to do with hens. One device which he called the "Hen Walker," was for the purpose of preventing the hen from scratching the house wife's garden patch, and was simply a movable brace to be attached to the hen's legs so that each time she moved her feet she was projected ahead until finally she found herself clear outside the garden.

The second device was called the Hen Persuader and consisted of a trap door suitably hinged under the hen's nest and which allowed the egg when laid to drop down on a cushion out of sight of the chief actor who would then begin the process of laying another egg and so on until the hen's resources became exhausted.

In Hay's Lincoln he tells the Cave of Adullam story in connection with the sorehead Convention in Cleveland, that nominated Fremont and Cochrane—Hay says that—

"On the morning after the Convention, (May 31, 1864,) a friend giving Mr. Lincoln an account of its proceedings remarked that there were at one time more than 400 men and that the President, struck by the number reached for the bible that commonly lay on his desk and after a moment's search read these words—Samuel 22:1—."

"And every one that was in distress, and every one that was in debt, and every one that was discontented, gathered themselves unto him, and he became a captain over them; and there were with him about four hundred men."

But my recollection is that when Mr. Lincoln was

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in the telegraph office the next evening after the Convention, some one called his attention to an editorial in a newspaper which quoted the above scripture and likened David to Fremont because each was made Captain over 400 discontented men, whereupon Mr. Lincoln called for a bible in order that the context might be referred to.

One of the attaches, Secretary Stanton's private secretary (Major A. E. H. Johnson) ran to get the copy from the adjoining room and shortly returned with it presenting it to the President with—his accustomed elaborate courtesy. This gentleman's reverential manner attracted the close attention of all in the room and upon his departure Mr. Lincoln arose with a twinkle in his eye and leaving the room for a moment he returned with the open bible in both hands and made a mock presentation of it to Major Eckert, mimicing the style and action of the private secretary who was undersized, dapper and precise, but in fact extremely graceful in his manner—The contrast between Mr. Lincoln's tall ungainly form and that of the secretary was marked and the whole affair so funny that we were all convulsed with laughter.

A Pen Picture or Two

By R. W. Ledwith

Once a telegrapher always a telegrapher! Is that so?

In bygone days this query or observation was a favorite subject of discussion in the office lunch room and elsewhere. It may be today. I am not informed. Three Chicago incidents of recent date revives the contention. A pen picture or two may be interesting if not decisive. Of course, there are many others pro and con.

A fortnight or more ago a general superintendent of one of the commercial telegraph companies voluntarily retired. My first knowledge of the man was the day of President Garfield's funeral in Cleveland, Ohio. That was in September, 1880. He was then (for that day at least) what the mercantile world of today call a "floor walker." He was routing business. He has been routing business in various official capacities ever since and with an intelligence and fidelity which has earned not only appreciation, but recognition in the award of a substantial pension.

That constructively is an affirmative illustrative of the query and as well, favorable to consecutive service. The question of thrift, whether the financial returns have been sufficient to leave a surplus, is a personal one. That is always up to the individual.

The Chicago Association of Commerce, January 14, 1923, started a commission to South America, to promote trade relations. Two of the commissioners were former telegraphers. The writer first met one of the commissioners in New York, each being a delegate to a telegraphers convention. The primary object of this convention was a trivial matter! We had determined in advance to extinguish a then twenty-million corporation or secure a twenty per cent advance in salaries. The corporation politely declined to be extinguished or advance salaries. So this commissioner resigned his New York job and came West, married and engaged in a variety of business enterprises, finally establishing himself in the hotel business in a popular Chicago Suburb. He prospered and is today reputed to be "well fixed." There are many willing to say it is all deserved.

The second former telegrapher and commissioner, as far as known to the writer appeared in Chicago as an employee of the Atlantic and Pacific Telegraph Company, later became manager, drifted into the electrical business as Western agent for an Eastern manufacturing concern and finally into the telephone field, becoming president of the Chicago Telephone Company, serving in each capacity with acknowledged ability and marked fidelity.

Thus we have illustrations of both sides of the contention. The majority probably rests with the affirmative. There are more "old timers" in the business than on the outside. But may not one say with our friend Shakespeare "there is a divinity that shapes our ends, rough them as we may."

Monopoly in Radio

The Federal Trade Commission, in a complaint issued on January 27th, charges that a monopoly has been formed in radio apparatus, both domestic and foreign, and that efforts are being made to perpetuate the present control beyond the life of existing patents.

The Radio Corporation of America, General Electric Company, American Telephone and Telegraph Company, Western Electric Company, Inc., Westinghouse Electric and Manufacturing Company, the International Radio Telegraph Company, United Fruit Company, and Wireless Specialty Apparatus Company are named as respondents, and are alleged to have violated the law against unfair competition in trade to the prejudice of the public.

In the language of the complainant, "the respondents have combined and conspired for the purpose of, and with the effect of, restraining competition and creating a monopoly in the manufacture, purchase and sale in interstate commerce of radio devices and apparatus, and other electrical devices and apparatus, and in domestic and trans-oceanic radio communication and broadcasting."

Glass as an Insulating Material

Editor: In a recent number of the Age there was an article in regard to a glass insulated underground cable in Chicago, put down by the Mutual Union Telegraph Company.

The Mutual Union Telegraph Company experimented in Washington, D. C., with glass insulated wires. I never saw them but it was a failure. If you can get in touch with some of the Mutual Union operators that worked in Washington in 1881, you probably can get some information about that one.

D. S. Robeson,
Philadelphia, Pa.

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IMPORTANT NEW CABLE DEVELOPMENT

Invention of "Permalloy" and "Permalloy Loaded Cable" Called Greatest Step Forward in Cable History Since Laying of First Transoceanic Cable

By Vice-President Frank B. Jewett

The invention of a new alloy called "permalloy" and the "permalloy loaded cable" is possibly the most important development in the whole history of cable construction since the first transoceanic cable was laid. It has unusual significance for it is the first radical change in cable construction in more than fifty years. It is expected that cables of the new type will have a traffic capacity four times that of existing cables of the same size.

The new invention may mean the construction and laying of direct cables of a length hitherto impossible on account of cost or limits of traffic capacity. In fact, the possibilities of the new cable from a traffic carrying standpoint seem to be such that direct cables could be laid over much longer routes than there is any commercial necessity for.

While this new cable using permalloy does not forecast the replacement of any existing means of transoceanic communication, the fact that it offers a very large increase in traffic capacity over long distances will undoubtedly result in a relignment of the fields of various kinds of world communication. Its introduction will tend to clarify the situation regarding the dividing line between the real fields of radio and cable in transoceanic communication.

The new cable makes use of inductive loading with the magnetic alloy, permalloy, developed by the engineers of the Western Electric Company in the Bell System Laboratories. The first cable of the new type has been ordered by the Western Union Telegraph Company, to be laid between New York and the Azores where it will connect with another new cable running to Italy. This will provide greatly improved telegraph service to the South of Europe.

Ever since the first successful trans-atlantic cable of 1858, cables have been of essentially the same type, though through the intervening years the size has been gradually increased until in the most recent long cable 1,100 pounds of copper per mile have been used. In contrast to developments in other electrical arts, submarine cables have been slowly and conservatively developed, this course being to some degree necessitated by the great expense and risk involved in cable undertakings.

On account of the predominance of British engineers in this field it should be gratifying to Americans to know that the latest development in the cable art and such a highly important one has been produced in America. The new invention is the result of years of patient research by the Engineers of the Western Electric Company.

The feature of the new cable is inductive loading by the newly developed magnetic alloy. The idea of loading is not new and is very simple. Signals are transmitted over cables and wires as in radio by waves, but instead of spreading out in all directions as do waves from a wireless antenna the waves over a wire or cable are confined to one path with the consequent advantages of secrecy and a saving of power. However, there is one important difficulty in sending waves over a long submarine cable of the ordinary type. The wave is started out as a strong current impulse or a steep wave front, but as it proceeds along the cable it flattens out so that instead of reaching the other end all at once it comes in as a long slowly rising electric current, and if a rapid succession of such waves are sent they spread into each other or overlap to such a degree that their identity is lost. The effect of loading the cable is to prevent the wave front from spreading out.

"Loading" the cable means simply giving it more inductance. Inductance, as all radio fans know, opposes the building up of an electric current in a circuit but once it has been established tends to keep that current flowing. This is just the action required to keep up the wave front of a signal on a cable. The inductance opposes the rise of current until the full force of the wave is felt, then when the current is flowing it aids it in continuing to flow and thus helps push the wave along. Thus with a loaded cable the wave does not spread out as in the present non-loaded cables but reaches the distant end with its energy concentrated in one blow and without having got lost in the crowd of other signals along the way. This permits sending the dots and dashes which make the telegraph signals in more rapid succession, and consequently more letters and words can be transmitted in a given time. On this account the "speed" of the cable is said to be greater.

This does not, however, mean that the signals travel faster on the loaded cable in miles per minute. In fact they travel more slowly since the inductive loading while holding up the wave front tends to retard their progress along the cable. In the case of the New York-Azores cable it will take three-tenths of a second for signals to get from one end to the other, but they will be following each other in such rapid succession that it will take six automatic typewriting machines to handle the volume of traffic flowing over the cable when operated at maximum speed.

Although the fundamental principles of loading have been well understood for many years, and although many inventors have considered its application to ocean cables, it is only with the invention of permalloy that it has been made practicable. In the mind of the engineer three names are associated with the inductive loading of long lines and cables. These are Heaviside, an Englishman who first conceived the idea, and Pupin and Krarup, each of whom proposed a method for its application. Professor Pupin of Columbia University proposed the insertion of inductance coils at intervals along the line. This method has been applied to long telephone lines on land but it is not applicable to ocean cables on account of the mechanical difficulties involved.

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Krarup, a Danish engineer, proposed wrapping an iron wire around the copper wire which carries the current. It is Krarup's method of surrounding the wire with a layer of magnetic material which is used in the new high speed cable, but the metal surrounding the copper wire is not iron but the new alloy, permalloy.

In construction the new cable is surprisingly like the old. It differs from it only in having a thin permalloy tape wrapped around the copper wire beneath the gutta-percha insulation. Though the tape is only six-thousandths of an inch thick it strengthens the magnetic field in the region where it lies by more than 2,000 times. The same amount of iron would not produce one-tenth the effect. In fact, if an iron tape were used in place of the permalloy the loss occasioned by its use would more than offset the gain, and this is the reason that telegraph cables have never been loaded.

Permalloy was not discovered by someone stumbling on it nor was it a dreamer's brilliant idea. All the easy inventions seem to have been made long ago. It was not even found by merely mixing its component parts, nickel and iron, together in different proportions and picking out the best. Special methods of testing had to be developed to detect the properties being sought for and then the effect of heating to high temperature and cooling at various rates had to be tried with all of a wide variety of mixtures before the best was found. Then hundreds of sections of cable conductor were tested and after several years of this patient work the desired result as far as could be ascertained from laboratory tests, was finally achieved.

Since there are no submarine cable manufacturers in this country, arrangements had to be made for an English concern to make the first cable of the new type. The Telegraph Construction and Maintenance Company of London, long preeminent in this field, undertook the manufacture with the advice and assistance of engineers of the Western Electric Company who supplied the permalloy tape for the cable.

Most of the electrical tests in the laboratory had been made upon pieces of cable not over 300 feet in length. A cable such as that between New York and the Azores is over 2,000 miles in length, and its cost is several millions of dollars. It was not satisfactory on the basis of the laboratory results alone to put through a project such as the cable from New York to the Azores. It was accordingly decided to make an experiment of laying a trial section of cable, 120 miles in length, in the full depth of water which is met in mid-ocean.

Bermuda was selected as a suitable place for making the test, partly because of its accessibility to New York and partly because the deep water near shore permitted a very severe test, and it was desired to make the test as severe as possible. On September 14, the Western Union Cable Ship, "Lord Kelvin sailed from London with the 120 miles of cable aboard and after a delay of a few days occasioned by a West Indian hurricane the cable was successfully laid off the south coast of Bermuda on October thirteenth.

To test the cable both ends had to be available to the operators, and it was therefore laid as a loop, most of it being in water more than two and one-half miles deep. Several weeks were required to make the tests which would prove the cable to be what the engineers had predicted. When the word of the successful result reached the Western Union Telegraph Company, they lost no time in giving orders to the manufacturing company to go ahead at once to make a cable of 2,300 miles to reach from the Hammels station at New York to Fayal in the Azores Island.

This cable is such a radical departure and offers such a great advance over the present art that it is too early to predict what its effect on world communication will be. Its possibilities in the Pacific are even more interesting than in the Atlantic on account of the present need for increased communication there. But there is one comforting thought about improvements in communication. They always react to the benefit of the public and always in the direction of better understanding and peace among men.

—o—

Radio Extends Help to Railroads and News Associations

RADIO had a new opportunity last Monday and Tuesday to "pinch hit" for the telegraph and telephone wires in the general dissemination of news out of Chicago. A severe sleet storm that swept over that city and much surrounding territory, put out of commission a considerable part of the ordinary means of fast communication between the principal cities.

Sending news over wires from Chicago to Omaha and numerous other cities was out of the question and the Associated Press gave radio its chance. At the same time it was given its first employment by some of the railroads in the sending of messages to various western points.

The Chicago broadcasting stations, WMAG, KYW and WJZ, were active in distributing news, as well as transmitting information about the storm and generally helping to lift the burden from crippled telegraph wires.

Relief to two trains, stalled in snowdrifts at Waupaca, Wis., was accomplished largely through a broadcasting station at Waupaca, WPAH. Wire communication was destroyed and news of the plight of the stalled passengers came by radio. A relief train was immediately dispatched.

In past years when the wires went down in such storms as that of February 4th, all means of quick communication between cities were useless sometimes for a few hours, sometimes for days. The introduction of the radio relieves the world of the possibility of that embarrassment in the future. If all the wires go down messages can still go through the air.

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Making Europe Part of United States Radio Audience

W. W. RODGERS, *Westinghouse Electric and Manufacturing Company*

EXPERIMENTS in short wave broadcasting by means of extremely high frequencies have reached a climax in the recent repeating of American broadcasts by British Stations.

The feat whereby American broadcasts are repeated on these short waves and received and rebroadcasted by English stations, thus reaching the peoples of Great Britain, France, Germany, Belgium and the Scandinavian countries, is the outcome of two years experimenting and perfecting of high frequency apparatus by Frank Conrad, assistant chief engineer of the Westinghouse Electric and Manufacturing Company, the man who has done, probably, more in an engineering way to perfect radio than any living man.

The interference problem first brought into prominence about two years ago when so many broadcasting stations had been started and were operating on very similar frequenicies first brought the idea to Mr. Conrad and his associates that extremely high frequencies held many possibilities for the ferfecting of broadcasting. Mr. Conrad started experimenting with his own station and from a short wave station installed on the roof of the Westinghouse plant, where the transmitting apparatus of KDKA, is located.

The first experimenting with short waves under 100 meters were made between the station at KDKA and amateurs living in the Pittsburgh vicinity. Encouraged by the results of these tests, a receiving and re-broadcasting station was located in the Westinghouse building at Cleveland. The first of KDKA's broadcasts to be repeated were transmitted from the station, whose call letters are KDPM. Then tests were made between East Pittsburgh and Springfield, Mass. which, too, were sucessful and finally, short wave or high frequency receivers—both terms mean the same thing—were installed in the homes of amateurs living in twenty cities or more located so that they covered the country. All holders of these sets reported that reception on short waves was very favorable and that there were none of the drawbacks to broadcast reception found on the higher wave lengths.

These experiments covered a period of two years, nearly up to the time when KFKX, the first radio repeating station in the world, was started by the Westinghouse Company at Hastings, Nebraska, last October. This repeating station made use of the high frequency broadcasting and reception for the repeating of KDKA's East Pittsburgh, Pa., concerts and actually meant that KDKA's concerts were covering the entire country.

The KFKX station operated so successfully that negotiations were started with friendly concerns located in Great Britain to test the reception of high frequency waves. It was found the high frequency signals crossed the Atlantic with the same ease that they crossed the United States. The first test set in Great Britain was located in the plant of the Metropolitan-Vickers Co., at Manchester, England, which made very favorable reports at East Pittsburgh upon the reception of the repeated concerts.

Next the repeating was carried on with the British Broadcasting Company, which has a monopoly on broadcasting in Great Britain. Six or seven of this company's stations were tied together by means of telephone lines and the repeating of KDKA's concerts was started. The result of this was that the people living in Great Britain and Eastern Europe heard American concerts as plainly as they could hear their own stations and with the same receiving sets. It was the greatest triumph that radio had made in the past year and has actually changed the whole future of broadcasting.

The high frequency transmitter that does the repeating is located on top of a nine-story building in the Westinghouse plant at East Pittsburgh, Pa. Because of the fact that high frequency sets are sensitive and can be thrown off their wave easily, the whole set is mounted on springs to guard against jars. To prevent the swinging of the antenna, it is drawn taut between its uprights and the down leads consist of copper tubing. The various inductances on the set are wound on rigid forms with copper tubing forming all leads. The transmitting set consists of three panels, as follows: the rectifier panel, the modulator panel and the oscillator panel. All the equipment represents the last word in transmitting apparatus with water-cooled tubes and special condensers.

The short wave transmitter is almost an exact duplicate of the big transmitting unit at KDKA with the changes necessary to efficiently work on the high frequencies.

One of the most striking things about the short wave transmitting set is the extremely short antenna used. The antenna at KDKA for use with the short wave receiver is slightly in excess of 35 feet. When the size of this antenna is compared to the 200 feet lengths of the antenna used for regular broadcasts the result is striking. That this small antenna will be sufficient to send broadcasts over the ocean is scarcely believed by many who see it.

In England the law prohibits large antenna, with the result that most antenna are under 40 feet. The result of this is that radio frequency receivers are the common apparatus used, so that the reception of the short wave signals is ideal on the continent.

The great difference between the short wave broadcasts (under 100 meters) and the common wave length band, approximately 360 meters can be noted by comparing the kilocycle frequency of two such waves. East Pittsburgh commonly transmits

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to England on a wave length of 94 meters which is a frequency of 3200 kilocycles. At the same time KDKA is broadcasting to its regular broadcast audiences of 326 meters, which is a frequency of 960 kilocycles. This difference in frequency tells much of the story of the short wave broadcasting.

Tests have proved that the high frequency broadcasts go farther with the same power input than the ordinary broadcasts waves. It has also been proved that daylight has little effect, if any, on this carrying power. These two qualities of the short waves are what is going to affect the future of broadcasting and bring a new broadcast era in the New Year just started.

Noiseless Merges With Remington

UNDER arrangements concluded a few days ago the Noiseless Typewriter Company joined forces with the Remington Typewriter Company under the name of the Remington-Noiseless Corporation. The Remington Typewriter Company will continue as at present, adding to its assets the shares which it receives from the transaction. B. L. Winchell, President of the Remington Typewriter Company, becomes President of the Remington-Noiseless Corporation, which has already been formed, and Dr. C. W. Colby, President of the Noiseless Company, becomes Chairman of the board of the new corporation. H. J. Fuller, Chairman of the board of the Noiseless Company, and Dr. Colby will be members of the board of the Remington Company.

In a statement issued following meetings of the boards of directors of the two companies the purpose of the amalgamation was explained as follows:

"It is believed by both companies to be of mutual advantage to combine forces for the manufacture and sale of writing machines practically noiseless in operation. Conforming to this purpose a new corporation, organized in New York and to be known as the Remington-Noiseless Corporation, has been formed.

"The securities to be presently issued are as follows: Preferred stock, 12,500 shares, $100 par value, 7 per cent. cumulative and convertible into common stock, 115,000 shares, no par value.

"Noiseless shareholders receive all the preferred stock and 50,000 shares of common. The Remington Company receives 65,000 shares of common. The Remington-Noiseless Corporation will have its own factory at Middletown, Conn., producing both standard and portable typewriters, which will be sold on its account through the Remington distributing points throughout the world. Full provision has been made to finance the assured expansion of Noiseless business.

"Underlying this union is the broad conception that the Remington Company and the Remington-Noiseless Company, working in close co-operation, will be enabled to supply a typewriter for every need, their products covering with unique completeness the whole field of typewriter requirement, combining machines for general office work, noiseless typewriters for secretarial and special office conditions, two varieties of portable machines, besides ribbons, carbon paper and other supplies.

The consolidation of interests will be put before the stockholders of the Noiseless Typewriter Company for ratification at an early date.

E. H. Hogshead

E. H. HOGSHEAD, who has recently returned to his old home at New Orleans from Nashville, Tenn., where he spent some time writes us as follows:—

"I hope I shall be well and able to enjoy the Old Timers' Reunion when it meets here next fall, and I hope you will be well and able to enjoy the occasion. I don't seem to pick up strength. I still have to have an escort, some one to hold my arm when I go out, but I get about the house and up and down stairs without assistance. Perhaps its decrepitude due to sinility, but I don't like to admit that, as I have good eyesight, good hearing and a mouth full of good teeth, and I have a vigorous appetite and good digestion. I shall have a birthday anniversary on February 10th. I shall score eighty-three years, if I live. My wife, two years my junior, is as well preserved as I and its a joy to us to trudge along together. We have been sweethearts since she was twelve and I fourteen."

Mr. Hogshead was one of the founders of the Old Time Telegraphers' and Historical Association at Cincinnati, Ohio, in 1880. He was then manager of the Meridian, Miss., office of the Western Union Telegraph Company, with which company he has been identified during his long and useful telegraph career. Mr. Hogshead has enjoyed the acquaintances of a large number of prominent telegraph and press association people.

Automatic Telegraph Company Receiver Asked

CHARLES E. SUMMERS, as administrator of the estate of Robert L. Dean filed suit in the circuit court, Kansas City, Mo., on January 26th, asking the appointment of a receiver for the Dean Auto matic Telegraph company, 422 East Tenth Street.

Judge Nelson E. Johnson appointed Philip E. Kopp, foreman for the automatic company, temporary receiver, and granted a temporary restraining order enjoining the officials of the company from disposing of the equipment. The restraining order is returnable before Judge James H. Austin.

Summers alleges he owns 125,000 shares in the telegraph company, which is being "grossly mismanaged and the property wasted." The Dean estate also has large holdings in the company, according to the petition.

Mr. Dean, who died in June, 1920, according to Summers, was the inventor of the electric telegraph system manufactured and installed by the company.

THE new General Electric high power broadcasting station near San Francisco, has been established and it is fulfilling every requirement.

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Ship Radio vs. Broadcasting

By Chas. J. Pannill

Vice-President, Independent Wireless Telegraph Company, New York

Radio's boom to mankind in bridging the limitless ocean wastes inspired widespread admiration. That science had evolved means for harnessing natural forces and using them for the transmission of messages from shore stations to ships in mid-ocean and vice versa, evoked interest and commendation.

Today ship radio is anathemized and lambasted until this golden haired child of a few years ago is now a miserable interloper.

All this develops from the appearance of broadcasting entertainments and its sweep throughout the length and breadth of the land. A new object of interest has appeared and like a Moloch it unrelentingly demands rights regardless of the welfare of others.

Radio broadcasting has several million devotees. Its widespread popularity cannot be denied, but sight has completely been lost of the need of retaining for exclusive ship to shore commercial traffic a sufficent number of wave lengths to accommodate this vitally important phase of steamship operation. The result is that radio broadcasting is steadily intruding upon the wave length areas available for transmission of commercial radio traffic from and to ships at sea. The broadcast listener comfortably ensconsed in his home, bitterly criticises the interference of "code" when he or she is listening to the lyric voice of some singer or the blare of a popular jazz orchestra. No thought is given to the fact that the much condemned "code" is conveying information either from or to the ships at sea; information of vital importance to steamship owners and cargo consignees as well as the public ashore who are interested in the welfare of their blood relations at sea. The radio broadcasting public expresses its dissatisfaction with ship interference and its voice being in the majority demands elimination of ship radio transmission from certain wave length areas without lending its support to the allocation of wave length areas to replace those the ships now have and to which they object.

Up to recently ship to shore traffic was handled on three wave lengths, namely 450, 600 and 706 meters. The intermediate wave length is the standard for radio reception for ships. Ship to shore communications are usually transmitted on the 450 or 706 meter wave length. By agreement, the 450 wave length is not used for commercial radio business during the hours of broadcasting entertainments except for urgent messages that cannot be transmitted on other waves and the result has been that commercial radio traffic is considerably delayed.

During the past month it was arranged that the shore stations could try out a plan to transmit to ships at sea at various wave lengths from 625 to 735 meters after calling the ships on 600 meters. Before this new arrangement, the shore stations sent on 600 and 706 meters; the ship on 450, 600 and 706 meters. The demands of the broadcasting stations for what is really sovereignity of the air, on short waves presents a very serious situation for the shipping business. It must be borne in mind that radio broadcasting stations are really commercial enterprises. Without broadcasting, there would be only a limited market for radio products such as vacuum tubes and etc. It is clear that radio broadcasting is part and parcel of a marketing plan for the sale of radio reception equipment. Viewed in this light, it will be seen that radio broadcasting, like commercial radio stations is a business proposition and that discussion reduces itself to the question whether broadcasting business has rights that are paramount to the commercial radio business.

The whole matter could be solved without much difficulty if the commercial radio stations were assigned new wave lengths. At present the ship radiophone is assigned wave lengths of 800 to 952 meters. This assignment could easily be cancelled and without causing any difficulty because ship radiophone is a limited quantity. The 800 meter wave length is assigned for navy compass signals and the 1000 meter wave length is assigned for the Department of Commerce radio compass signals and these could be reassigned to new wave lengths over 1000 meters so that with the elimination of the ship radiophone a wave band of 600 to 1000 meters could be assigned for exclusive commercial radio use, leaving the broadcasting field in undisputed possession of 200 to 600 meter wave lengths. The higher wave lengths would require some minor changes in ship equipment but their availability for use day and night, would enable the better handling of commercial radio traffic and the complete elimination of complaints from broadcasting enthusiasts of "code" interference.

The commercial radio companies have costly investments in shore stations. The companies are few in number but the service they render is important to every ship owner whose vessel is equipped with wireless and to every shipper and consignee of cargo, who because of fluctuating market conditions and the practice of selling commodities for future arrival, find it invaluable to keep thoroughly posted as to the whereabouts of their cargoes and possible time of arrival. This subject is one of great interest and broad ramifications. In view of the international conference which control ship radio, it is rather difficult o effect an immediate adjustment of the conflict between commercial radio and the broadcasting stations. International gatherings cannot be summoned at a month's notice while in the meantime the growls from the broadcasting listener because of "code" interference, usually due by the way to the non selectivity of amateur receiving equipment. The solution can be easily solved by proper wave length assignment.

Argentina Opens World Radio Plant

President de Alvear on January 25th, inaugurated the international high-power radio station at Monte Grande, operated jointly by American, British, French and German radio companies.

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EDITORIAL COMMENT

International Telephone Trust

ACCORDING to the *Financial Times London,* a group of American financiers has a project in hand for the consolidation of telephone systems throughout the world, and considerable progress has already been made to France, Spain, Italy, Belgium and several other countries, and the plans for "The International Telephone Trust" are expected to be further developed at the Inter-American Electrical Conference to be held at Mexico City in March. The moving spirit in this ambitious enterprise is believed to be the International Telephone and Telegraph Company, which is associated with the American Telephone and Telegraph Company, two concerns which already control telephonic communication in the United States, Canada, Cuba, Porto Rico and Uruguay, besides parts of Argentine and Chile. Progress in Europe has been handicapped by the reluctance of the Governments concerned to give up control, but in Spain, Italy, and Germany this difficulty has been overcome and the recent action of the French Government in agreeing to sell its West Indian cable system has aroused hope that something may eventually be accomplished in France. The ultimate ambition of the group is to control not only telephone, but transoceanic communication also by means of high-speed cables and standardization of apparatus development.

Use of Telegraph Doubles in Year

THE business of the Western Union Telegraph Company increased 100 per cent during the year 1923, and that corporation now employs nearly 70,000 persons, 15,000 of whom are messengers, according to Newcomb Carlton, its president, a visitor to Los Angeles, Calif.

He declared despite its enormous expansion the company's affairs are conducted along lines of public service and the first aim of all regulations is to supply efficiency.

Addressing the Boy Scouts at the conference being held in the Biltmore hotel, Mr. Carlton told of the work of his corporation among the 15,000 boys in i s service, explained that the aim was to establish a system embodying the principles of honor among them, and that its ideals were much the same as those of the Boy Scouts' organization.

From that city he will go to several adjacent cities on an inspection tour, and will then return to Los Angeles leaving this city on January 27th for the East.—*Los Angeles Herald.*

London-Paris Direct Cable

A LONDON-PARIS direct cable is projected by the Eastern Telegraph Company Limited. Already negotiations are in progress, and two directors are about to visit Paris to confer with the French postal officials. Although the French have direct wires both to London and Liverpool, the British have no reciprocal facilities. The announcement of the London-Emden direct line now being laid by the Eastern Company has raised the question. There is no desire on the part of the Eastern group to give facilities to Germany to the disadvantage of French commercial interests.

Direct Cable Service With the French Public

SINCE the beginning of the new year, the Western Union Telegraph Company and the Commercial Cable Company, for the first time have been able to do business directly with the general public in France. Prior to that date all messages of this character had to be handed over to the French post office for transmission to Havre, where they were returned to the cable company again for transmission, via England, to the United States.

Edison's Birthplace Gets Electric Lights

THE little brick house in the village of Milan, Ohio, in which Thomas A. Edison was born nearly seventy-seven years ago, was electrically illuminated January 31st, for the first time. Until January 31st, the old-fashioned kerosene lamp had held full sway.

The house, with the approximately one acre of land on which it stands, is owned and occupied by Edison's second cousin, Miss Marietta Atwood. The introduction of illumination, originated by Edison, passed practically unnoticed in Milan.

F. E. d'Humy, Author of an Inspiring Book

IN most large commercial organizations there is today charged to materialism, ego, acquisitiveness, and other characterizations of this order, much of the discontent and indifferent performance so prevalent among the rank and file of those carrying on the details of the world's work.

Thinking men—both those engaged in executive capacities and those in closer touch with the offices and the shops—have sensed that the one untried line of betterment remaining is that which recognizes the possibilities of improvement in the state of mind of the individual.

It is not necessary to be a sage or a philosopher to know that much of the woe through which many people imagine they are drifting is, in reality, a state of mind.

Mr. d'Humy has written a book which aims at a correction of this blight, which so insidiously slows up individual progress and individual realization of life's most agreeable gifts.

The title of this new book is "Conscience and Success." Copies may be purchased from Telegraph and Telephone Age, 253 Broadway, New York, at $1.00 each.

"CHARLEY, dear," said young Mrs. Torkins, "they ought to put a stop to this wireless at once. The idea of scattering all those messages indiscriminately through the air we breathe! It must be very unhealthy!"

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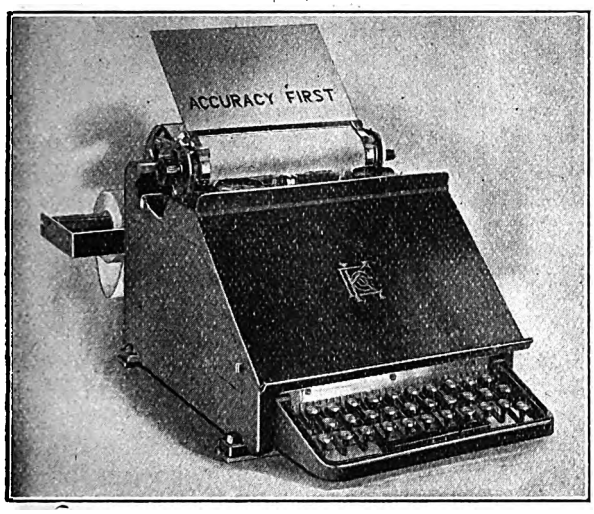
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER



AN ENTIRE SYSTEM
IN
ONE SIMPLE TYPEWRITER UNIT
Not Merely A New Design.
A Revolutionary Change.
The Unit that proves in on lightly loaded circuits.

Kleinschmidt Electric Co.
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HALL SWITCH & SIGNAL CO.

Garwood, N. J. Chicago

MANUFACTURERS OF THE

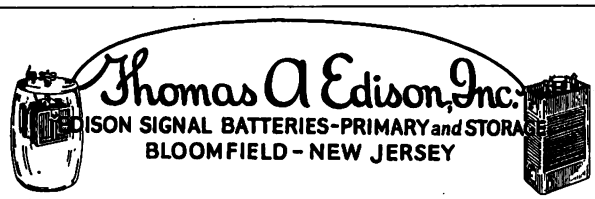
GILL SELECTOR

THE UNIVERSAL SELECTOR
FOR
TELEGRAPH AND TELEPHONE

The Battery Must Be Reliable

The importance of the telephone and the telegraph is typified in the care that is being taken to manufacture reliable and efficient apparatus. But no matter how well the apparatus is constructed, it is of little value unless the battery supplying the energy is of similar reliability and efficiency, with resultant clear transmission and non-interruption of service.

Many progressive Signal Engineers believe that the primary battery best guarantees this reliability and efficiency. We shall be glad to have you write us regarding your own personal experiences or ask us questions regarding signal battery work.



ST. LOUIS
Railway Exchange Bldg.

CHICAGO
Peoples Gas Bldg.

SAN FRANCISCO
406 Balboa Bldg.

2001-36

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KERITE
LACKAWANNA RAILROAD
DAYS KERITE
KERITE INSULATED WIRE & CABLE COMPANY
NEW YORK CHICAGO

THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

A MEETING of the Committee of Direction will be held at 431 So. Dearborn Street, Chicago, Ill., February 19 and 20. The first day's session will convene at 9.30 A. M.

SUB-COMMITTEE G—Apparatus, Material and Tools, will hold a meeting at 431 South Dearborn Street, Chicago, on February 25th and 26th.

Sub-Committee J—Circuits and Current Supply, will hold a meeting in Chicago, February 25th and 26th.

Sub-Committee on Circuits of Committee No. 2—Construction and Maintenance of Inside Plant will hold a meeting in Chicago, on February 27th and 28th.

Sub-Committee K—Installation and Maintenance, will hold a meeting in Chicago, on February 29th and March 1st.

Train Control by Radio

AUTOMATIC train control by radio will be installed on at least one division of forty-nine first-class roads of the country by 1925, it was announced at the opening session of the fourteenth annual convention of the Association of Railway Electrical Engineers.

Radio holds possibilities of inter-communication between moving trains and fixed points for personal wire or phone service and holds more promise of real value in the future than broadcast reception.

All America Cables

MANAGER M. HURST has left Punta Arena, Costa Rica, on furlough.

Manager C. H. Burns of LaPaz, Bolivia, has left for a trip into the interior.

Operator H. W. Usher, has resumed duty at Santos, after temporary duty at Sao Paulo, Brazil.

Supervisor G. Pratt has been transferred to the commercial department with headquarters at New York.

Operator L. C. Martin has been promoted to be supervisor, vice G. Pratt.

Acting Manager C. F. Skinner has been pensioned after twenty-eight years of service with the company, and will reside in Southern Chile.

Canadian National Telegraphs

IN honor of the recent appointment of Chas. E. Davies to the position of acting general manager of the Canadian National Telegraphs at Toronto, Sidney B. McMichael tendered a dinner on January 25th, at the National Club, to a few of Mr. Davies' immediate officials. The evening was spent in a very sociable way and to the apparent enjoyment of those present, including W. G. Barber, general superintendent, A. C. McConnell, secretary and auditor, J. F. McTaggart, treasurer, E. G. Hunter, chief clerk, E. Kenward, district plant superintendent, C. W. Dawzy, superintendent, W. J. Pitfield, traffic manager, Geo. Watt, superintendent of supplies and G. H. Walters, manager.

THEY ALL COME BACK.

It is gratifying to note how often we sell some one a small order and after a time the customer comes back for more.

One case in particular comes to mind in which the customer ordered two Teletypes and kept coming back for more until now this customer has taken forty.

The latest example is that of the Japanese government. Some time ago they purchased four Teletypes. The other day we shipped them an order of **SEVEN TONS** of Teletypes and Morkrum Multiplex.

Obviously our best selling argument is our apparatus itself.

MORKRUM COMPANY

CHICAGO
1410 Wrightwood Avenue

NEW YORK
World Building

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The First Telephones in Canada

P. C. KULLMAN and Company, the wireless brokerage house of 110-116 Nassau Street, New York, have sent us a fac-simile of one of the first telephone contracts entered into by Alexander Melville Bell, the father of Alexander Graham Bell of the Bell Telephone Company with the Honorable Alexander MacKenzie, Minister of Public Works of Canada. The contract is so interesting that we are constrained to print a goodly portion of it so that our readers may contrast it with the telephone contracts and performances of today.

1877

Fac-simile of Telephone contract between the Minister of Public Works and Alexander Melville Bell, dated September 21st, 1877, when stock, in the Bell Telephone Company could be bought at anywhere from 25 cents to $10.00 per share. This stock is now worth about $5,000.00 a share.

THIS LEASE, made this twenty-first day of September, eighteen hundred and seventy seven, by and between ALEXANDER MELVILLE BELL, of the City of Brantford, Ontario, Lessor, party of the first part, and Hon. Alexander MacKenzie, Minister of Public Works, Ottawa, Lessee, party of the second part.

WITNESSETH, that the Lessor, in consideration doth lease unto said Lessee the two four hand telephones numbered sixteen, eighteen, nineteen and twenty-two, with two call-bell instruments respectively, said Telephones being constructed according to the specifications, and embodying the inventions described in Letters Patent of the Dominion of Canada, No. 7789, granted to Alexander Graham Bell on the twenty-fourth day of August, 1877, said patent having been assigned by said Bell to said Lessor, it being hereby stipulated and agreed to that the said two hand telephones shall be used only as hand apparatus. One at either end of the line of communication hereinafter mentioned.

The Lessor doth hereby license the Lessee and persons in his employment to use said Telephones for communications between Departmental Buildings in Ottawa, in the county of Carleton, in the Province of Ontario and Redeau Hall in the County of Russell and Province of Ontario aforesaid and in no other place, upon the terms and conditions herein set forth, and also to use any other patents which the Lessor now has, or may hereafter obtain, applicable to said Telephones, and necessary to the use and enjoyment thereof.

The Lessor agrees, First, that if said Lessee desires to remove said Telephones and to use them for the same purpose in any other place, he will, on surrender to this lease, execute another lease for the use of said Telephones in such other place.

Second. That he will keep said Telephones in good order and repair at his own expense, except when injured by the carelessness or neglect of the Lessee.

The Lessee agrees,

First, That he will pay the Lessor or his agent or legal representatives as rent for the Telephones and instruments hereby leased the sum of forty-two dollars and fifty cents per annum, payable annually in advance, on the twenty-first day of september in each year.

Second, That he will not transmit messages for hire, nor remove, transfer, or attempt to sell said Telephones, and that he will give to the agent of the Lessor free access at all reasonable times to the premises where the Telephones hereby leased are kept or operated, for the purpose of inspecting or repairing the same, or of taking possession of and removing the same, whenever such right of possession and removal shall vest in the Lessor or his legal representatives as herein provided.

Third. That he will not in any way violate, infringe, or contest the validity of any of the patents, he is hereby licensed to use, or contest the validity of the title of the Lessor, or of his legal representatives to said patents or any of them.

It is mutually understood and agreed:

That either party may determine this lease at any time after the expiration of the date hereof, by giving thirty days notice in writing to the other party, the Lessee or his legal representatives paying any amount then due and surrendering the Telephones and instruments and this lease.

That if this lease shall be assigned by the Lessee, by his own act or by operation of law, or if the Lessee refuses or neglects to perform, or violates any of the conditions of this lease, it shall thereupon, at the election of the Lessor, cease and be determined, and the right of possession of said Telephones and instruments shall revest in the Lessor or his legal representatives, but said Lessee shall have no claim for the payments of any part of the sum which he may have paid for rent under this indenture.

This Lease shall be void unless countersigned by the Agent for said Telephones at Ottawa.

Signed in duplicate the day and year first above written.

Alexander Melville Bell,
(Countersigned), Wm. S. Pettegrew,
Agent at Ottawa.

1877

Office of
Telephone Company of Canada.

.....

Sanderson & Son,
(General Agents)

Brantford, 23rd Nov., 1877.

Received of Minister of Public Works, per W. S. Pettegrew, the sum of forty-two dollars and fifty cents, being the rental for two hand Telephones same being numbered 16, 18, 19 and 22, for the year ending 21st September., 1878.

G. K. Henderson, General Agent.

.....

Duplicate

Facsimile of receipt dated Nov. 23, 1877, of the first real money earned by the Bell Telephone Company in Canada on two (2) hand telephones, attached to two (2) miles of wire, supplied by Alexander

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Melville Bell, the father of the Telephone inventor, to the Minister of Public Works of Canada, Hon. Alexander MacKenzie.

WHAT A CONTRAST

THE American (Bell Telephone and Telegraph Company had, (in January 1923,) 5,740 exchanges on Central Offices, 10,837,440 miles of wire, (on poles and in buildings), 19,779,082 miles of wire underground, or a total of 31,810,312 miles of wire. The number of stations (of the Bell Company,) is 14,050,585 and the number of messages per year in the United States alone exceed 13,999,210,000.

The net earnings of the Bell Company for the year 1922, were $66,170,428. It paid to its stockholders $52,971,252, in dividends In addition to the Bell Company there are about 10,200 independent and connecting Telephone Companies, with over 4.500,-000 stations. The number of employees in the Bell Telephone Company alone is over 240,000.

In order to form an idea of the enormity of the growth of the Telephone business, it may be interesting to note that in 1879, the New York Telephone Directory consisted of a small card containing 252 names of subscribers. The edition of May, 1923 of the New York City Telephone Directory, contains 1685 pages, four columns to a page, over 718,000 names, is a foot square and weights 4 pounds 13 ounces; 1,160,000 of these directories, weighing over 2791 tons, are necessary to supply the demand of this industry in one city alone, of which Alexander Melville Bell, the father of the inventor, leased out four hand telephones, in person, to the Minister of Public Works, in Ottawa, Ont., at $42.00 a year.

Surprise Party and Greatly Surprised Husbands

MRS. DR. IRWIN, Mrs. "Old Farmer" Lawton and Mrs. Bob Cloud have about as hard a time "Bringing Up Father" as George McManus in his pictorial account of the Jiggs family.

Doc, Bob and the "old farmer" thought they had a corn-beef and cabbage dinner arranged for Sunday afternoon but shortly before noon their most affectionate wives took their hubbies by the ear with one hand and with well filled baskets of eats in their other hand marched down to Jay Botts' residence, where they served a birthday surprise dinner to Mrs. Botts.

Shortly after the big meal was served the doctor and Bob made their getaway through a back bedroom window, but the last heard of the "Old Farmer" the ladies had him surrounded and he was most meekly wiping the dishes.

Phototelegraphy

FRANCE on January 1st inaugurated what is known as phototelegraphy.

By this service exact reproductions of the originals will be delivered to the persons to whom they are addressed. The cost of photo-telegrams will vary from 2s. 6d. to 5s., according to the dimensions of the document or picture to be transmitted, which must not exceed 5.3 in. by 3.75 in. Additional offices will be opened in Paris on January 16th.

Radio Corporation of America

COLONEL SAMUEL REBER, has been appointed director of traffic production, vice Lee Lemon, resigned.

David Sarnoff, vice-president and general manager, has returned from his trip in the West.

OBITUARY

Death of Charles H. H. Cottrell

CHARLES H. H. COTTRELL, aged seventy-five years, formerly of New York, but for the past several years a resident of New Orleans, La., died in that city on January 29th. Mr. Cottrell was born at Cleveland, Ohio, and entered the telegraph service on the Cleveland and Pittsburgh Railway.

In 1865, he came to New York for the American Telegraph Company, and later was appointed chief operator of the Insulated Telegraph Company's New York office. In 1872, he was appointed chief operator of the cable department of the Western Union Telegraph Company, New York. In 1874, Mr. Cottrell was made chief operator of the Western Union Telegraph Company at New Orleans, La., and in 1875, he went to London, England, for the Associated Press. Mr. Cottrell traveled extensively, holding positions of trust in various telegraph, transportation, theatrical and news concerns in America and Europe. In 1886, he was cashier for the United Press, New York, which position he held until that concern went into the hands of a receiver in 1897, since which time he had worked for the Western Union Telegraph Company at various points.

JOHN W. SMITH, aged seventy-nine years, an old time telegrapher who worked for many years in Chicago for the Western Union and Postal Telegraph Cable Companies, died at Santiago, Iowa, on January 4. For the past ten years Mr. Smith has been Agent for the Chicago Great Western Railroad at Santiago, Iowa.

On June 21, 1864, at the age of nineteen years, he enlisted in the Military Corps of the United States Army, in which he served until the close of the war receiving an honorable discharge in 1865.

His remains were buried at Santiago. So far as known to his friends he left no living relatives.

A Correction

IN our issue of January 16th, we printed an item reading as follows: "R. Sullivan of the Postal Telegraph-Cable Company at San Francisco, Calif., in remitting to cover his subscription for another year writes:—"The Age never fails to interest a telegraph man." It appears that Mr. Sullivan is the Pacific Coast Commercial Representative of the All America Cables, and writes us as follows which is self explanatory. "I am an admirer of the Postal Telegraph-Cable Company and a strong supporter, but not one of them."

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approved by E. F. Kelley, city superintendent, and Supervised by E. E. Farr, Manager of Delivery for the Western Union Telegraph Company.

The Board of Education furnishes the teachers and class rooms and supervises the educational work under the Smith-Hughes Act—a federal law which provides generous aid for the education of boys and girls in employment. This type of work is classed as part-time general continuation, and is under the direction of M. S. Olsen, Co-ordinator for the Board of Education.

E. F. Kelley, city superintendent, Minneapolis, has the congratulations of the entire fraternity in his efforts to give the messenger boys in his employ an education that will fit them for better positions in or out of the service. The President of the company, Newcomb Carlton, is on record as saying that he would like to see the messenger boys properly trained and educated to fit them for the better things of life. Here is an opportunity for Mr. Kelley to show the fraternity what there is in the average messenger boy. We predict that Mr. Kelley's efforts to educate the messengers will prove a great success.

THE Western Union Messenger Boys' Concert Orchestra of Minneapolis, broadcasted a program of popular music from Radio Station, WLAG, Minneapolis on December 14, 1923. The boys made a decided hit, many requests being received for repetition of certain numbers on the program.

The following prizes were offered:

One half barrel, Pillsbury Flour Mills Co., Pillsbury's Best flour for telegram from longest distance received during concert. (Won by J. E. Wilson, Charlotte, N. C.)

One half barrel, Russell Miller Milling Co's Occident flour, for longest distance letter received before Christmas. (Won by Mr. and Mrs. J. J. Strieby, Brauley, Calif.)

One half barrel Washburn Crosby's Gold Medal Flour, for most original telegram received during concert. (Won by Geo. Joslyn, Minneapolis.)

Three special prizes chosen by lot from telegrams and letters received after concert:

One half barrel Washburn Crosby's Gold Medal Flour. (Won by Mrs. J. Lorenz, 4433 42nd Ave. South, Minneapolis.)

One half barrel Russell Miller Milling Co's Occident flour. (Won by R. E. Leis, Box C, Gallup, N. M.)

One half barrel Pillsbury Flour Mills Co's Pillsbury's Best flour. (Won by G. K. Luker, Simpson, Sask. Canada.)

One hundred and sixty-seven telegrams and six hundred and ninety-two letters and cards were received, the senders all expressing much pleasure on hearing the program.

This orchestra was organized in 1922, under the supervision of Delivery Manager, E. E. Farr, and directed by John P. Rossiter. It is one of the most popular musical organizations in Minneapolis.

Cable Codes

There are a large number of cable codes on the market available for use by business people.

This publication is headquarters for all cable codes. We possess information on most all of them and are prepared to impart this information to those desiring the same. Telegraph people should bear these facts in mind when information regarding codes is desired by customers. Pass the inquiries on to us and they will receive our immediate attention.

The following is a list, together with prices, of a few of the principal codes, which we are prepared to furnish on request:

A B C Code, 5th Edition	$12.00
A B C Code, 5th Edition Improved, English or Spanish	20.00
A B C, Code, 6th Edition	16.00
Bentley Complete Phrase Code	15.00
Bentley Complete Phrase Code, Pocket size	7.50
Bentley Complete Phrase Code, Spanish Edition	25.00
Commercial Telegraph and Cable Code and Appendix	20.00
General Telegraph Code	20.00
Lieber's Code, English, French or Spanish	15.00
Peterson's International Banking Code	15.00
Postal Code	10.00
Postal Code, Pocket size	7.50
Scott's Code, 10th Edition, with Bentley Supplement	27.50
Scott's Bentley Supplement	7 50
Universal Trade Code	25.00
Western Union Code, 5 Letter Edition	30.00
Western Union Code, Universal Edition	20.00

Prices quoted are F. O. B. New York and subject to change without notice. Prices on other codes not mentioned will be furnished on request.

Address all orders and make remittances payable to

TELEGRAPH AND TELEPHONE AGE,
253 Broadway, - - - - New York

The Most Sought After Electrical Book on the Market

"Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," by Willis H. Jones, offers the most complete study of the telegraph ever published. This standard text-book has been revised and brought up to date, and in addition to numerous diagrams and complete information covering the study of the telegraph, includes full descriptions of the newest apparatus adopted by the Western Union and Postal Telegraph companies, and describes the equipment of a modern telegraph office. This valuable book, with its 488 pages, 250 illustrations, and carrying an appendix of 24 pages and 16 illustrations covering the new Western Union Multiplex System, is the most sought after electrical book on the market. $2.50 per copy. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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PERSONAL

A. W. ALLEN, superintendent of buildings and supplies of the Bell Telephone Company, New York, has been appointed vice-president and general manager of the Holmes Electric Protective Company, New York.

POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice president and general manager, has just returned from a western trip during which he visited the offices at Cleveland, Dayton, Detroit, Chicago and Minneapolis.

W. B. Dunn, secretary, has returned from a trip to Buffalo and Syracuse, N. Y.

C. F. Leonard, general superintendent, reports that his son, Chester F. Leonard, has been appointed assistant general attorney for the Erie Railroad Company, New York, effective January 1st.

Joseph Devlin, aged twenty years, an employee of the auditing department, New York City, and a resident of Brooklyn, was struck by an automobile and killed recently.

Commercial Pacific Cable Co.

JOHN GOLDHAMMER has been appointed Vice-President and J. J. Delehanty has been appointed traffic manager.

Supervisor W. S. Fraser of San Francisco, while on his way home from the office on January 26th last, was struck by an automobile and sustained injuries to his head. He is at present in the St. Francis Hospital in San Francisco.

Supervisor McDermid is enroute to Manila to take duty at that place.

Wireless for Lonely Operators

EDITOR:—

I recently read a newspaper statement that the Canadian Pacific Railway Company intended furnishing radio equipment for all their employees.

This reminded me of an article in your issue of December 16th, 1923, headed Telephone now 50-50 with telegraph on railroad work. And particularly to the listing on page 583 of the advantages and the first paragraph referring to these advantages.

Captain Gorby, is right as to the better feeling use of the telephone engenders. Perhaps the idea of our foreman out west, might help make pleasant the night stretches of the lonely operator.

On circuits equipped with A. C. selectors—he relays from the loud speaker of his radio set to all offices, concerts, news and talks.

This does not in anyway interfere with ordinary operation of the circuits.

There are probably many places where this could be done readily and give to the night operators considerable pleasure.

Sincerely,

W. P. MCFARLANE, Assistant Superintendent of Telegraph, Chicago and Northwestern Railroad, Omaha, Nebr.

Dinner of the Static Club

ABOUT one hundred and thirty-two members of the Static Club and their guests attended a meeting and banquet in the North Ballroom of the Hotel Astor, Thursday evening, February 7th. The principal speaker of the evening was Colonel Samuel Reber the former Japanese representative of the Radio Corporation of America, who told of the experiences during the disastrous earthquake that played havoc with that country last summer. The talk was illustrated with lantern slides and those present saw scenes which vividly described the wreck, ruin and horror which the Japanese nation suffered.

It was the first time that women of the Company were extended the "privilege of entering the private sanctuary of the confides of the Static Club," as Pierre H. Boucheron, President of the Club, so ably expressed it, and some thirty-six members of the "staticless" sex partook of the opportunity.

Incidently, Mr. Boucheron, Manager of the Advertising and Publicity Department, was having his first experience as toastmaster in his new capacity of President.

General Harbord, President of the Radio Corporation of America, and David Sarnoff, Vice-President and General Manager, spoke preceding Col. Reber's talk.

The purpose of the organization being primarily social and all entertainment necessarily having to come from the members, George Clark, of the Research Department, and Mr. Elhert of the Accounting Department, somewhat aided and abetted the joviality that existed during the banquet. George Clark told of his heretofore unrelated two year experience in Atlanta Prison, while the outside world thought he was on a business trip. It was rib-provoking and put over in George Clark's own style.

Mr. Elhert told stories, sang, and made merry in general. A trained seal act was on the program, but Eddie Kaminsky brought the news that the seal had "frigid flippers." After the formalities were disposed of, the men and women danced to music from the orchestra, which kept the air lively throughout the night.

Telegraph and Telephone Materials for China

THE Chinese Government Telegraph Material Supply Department, Shanghai, which supplies materials to telegraph and telephone stations all over the country, has started work on an estimate of telegraph and telephone materials wanted in 1924. As the battery factory at Pootung has been ordered closed by the ministry of communications, this estimate will doubtless include the supply of batteries. Tenders will be invited in March, 1924.—*The Chinese Economic Bulletin*, December 8.

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THE WESTERN UNION TELEGRAPH CO.

NEWCOMB CARLTON, president; G. M. Yorke, vice-president in charge of engineering; J. C. Willever, vice-president in charge of commercial; J. J. Welch, vice-president in charge of traffic; W. C. Titley, vice-president in charge of Plant, and W. C. Merley, secretary to the party returned from their trip of inspection to the Pacific Coast on February 2nd. The party expresses itself as well pleased with conditions in general and the visited Western Union offices in particular, which they found well managed and up-to-date.

E. L. Kordi, identified with the Egyptian Telegraph Administration at Cairo, Egypt, is in New York studying telegraph conditions. Mr. Kordi, is a graduate of the Preparatory School of Cairo and of the Cairo University. While in the city he will make the Western Union Telegraph Company his headquarters. Mr. Kordi has already spent over a year studying telephone conditions with the Stromberg Carlson Telephone Company of Rochester, N. Y.

J. P. Lathrop, the late night chief operator at 24 Walker Street, has returned to duty from sick leave.

J. F. W. ULRICH, a member of the Western Union Telegraph Company's force at 24 Walker Street, died in a hospital on January 25th. Mr. Ulrich had been identified with the force for over twenty-five years.

A MAN believed to have been Lloyd J. Moorehead, a telegrapher, of 92 Clark Street, Brooklyn, was killed by falling from the platform of the Park Place station. His body lay beside the track for several hours before it was discovered by the motorman of a passing train.

Mr. Moorehead was a member of the Western Union force at 24 Walker Street.

C. V. AUGER, Southern Divisional Manager, London, England, arrived in New York on the steamship Majestic, on January 30th. Mr. Auger's trip to New York will be one of business and pleasure.

Western Union Messengers' Band Broadcasts Concert.

THE Western Union Messengers' Band of New York City recently gave radio fans a treat when they broadcasted from station WJY at the request of the Radio Corporation of America. Fifty pieces were assembled under the leadership of 1st Lieut. E. A. Hopf, O. R. C., U. S. A., instructor and director of the band, and although young in years the boys played like veterans.

The following program was rendered:

1. Fort Gay March. 2. Amercian Patrol, March. 3. Tramp, Tramp, Tramp, March and cornet solo. 4. Operatic Minglo. 5. National Emblem March. 6. Star of Evening, Waltz. 7. Our Director, March. 8. Star Spangled Banner.

Many telegrams and letters of appreciation were received from those who listened in.

Clever Delivery Service

THE Western Union Telegraph Company under the direction of J. C. Willever, vice president in charge of commercial, makes it a point to deliver a message in any city to which it is addressed if the party lives within the city limits. The following experiences are sent us by local officials of that company for publication to show the resourcefulness of the messenger boys when they are sent out with a message to be delivered:

ST. PAUL, MINN.

"The following is a report of incoming messages with garbled addresses which were successfully delivered by our Delivery Department:

William Winestine, 508 Dayton Ave. NSN., called information—phoned to 580 Dayton Ave.

Northwestern Auto Supply Co., delivered to Western Auto Supply Company.

C. E. Johnson, 183 No. Ave. Alcans, phoned to 183 No. St. Albans St.

Mrs. E. Scott, 555 Olive St. NSN, phoned to 555 Oliver St.

Mogis Bros. and Luther—delivered to Noyes Bros. & Cutler.

West Cubbege Co., delivered to Webb Publishing Co.

C. O. Kapme, delivered to C. O. Kalman.

Capitol Supply Co., not listed in phone or city directory—delivered to Capital Suspender Co.

ABERDEEN, SO. DAK.

"Roy Biegler was given a message addressed to Christine Hughes from Clay Center, Kans. to meet party at Huron. The message was in care of Milw. train No. 6, there being charges on message account forwarding charges. Messenger Biegler announced name until he got tired, and not making delivery in this fashion, idea struck him somehow, he gets in the Baggage door entrance, of course he was in Uniform, which is noticeable, then yelled, Ladies and Gentlemen, will all kindly step forward here for just a moment, the crowd gathered. Biegler then said, I have a telegram for Christine Hughes—lady in the crowd answered. 'That's me'."

LINCOLN, NEBR.

"On August 6th, a message addressed to Mrs. F. A. March, 3936 Orchard Street, was received in the Lincoln office from Clymers, Indiana. There is no such address as this in Lincoln, and after following the usual routine trying to effect delivery without success, Delivery Clerk Hazel Pershall, referred to the City directory under 'Orchard Street' and found Mrs. T. A. Marcy, listed at 2936 Orchard Street. Her telephone number was secured and the telegram was delivered to her at this address."

KANSAS CITY, MO.

"Motor Messenger Harry Eisenberg, No. 190, had an intrastate star message for J. N. Smith, care K. C. Ry. Co., 18th and Olive. Upon inquiring he learned the addressee was a conductor on the Indiana-Quindaro Line and that he was in Kansas City,

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Kansas, at the time. He got information that the car would arrive at 8th and Grand at a certain time, so he routed his remaining deliveries accordingly and delivered the message just in time."

"Buddy Branson, Messenger No. 146, was handed a message to be delivered to Capt. Yanz, Care U. S. Steamer on Missouri River, 1st and Main Streets. Could not find the Steamer but another riverman informed messenger that Capt. Yanz was on steamer on other side of river. He rode his bicycle back and went over to the other side paying the Bridge Toll himself. He delivered the message and 'Got the Answer'."

GRAND FORKS, N. DAK.

S. Clausin, Care Northern Banking Co., delivered to B. Clawson, Northern Packing Co. Delivery Clerk in this case also secured a money transfer from this party.

REDFIELD, S. DAK.

"Telegram from New York City to party at Redfield, addressed to 'Johermes Helloorf.' Not listed in telephone book—Tried all hotels, schools, rooming houses, garages, colleges, post office. Inquired at banks if a ticket had been sent him, in meantime had sent a service to New York to find if name was correct and found it was. So then decided it must be some foreign language and made a guess at 'Joseph Holdorf' located a family by that name in city directory at Hotel, so called at this home and inquired if they were expecting anyone by name of 'Fedderud' signature on message and found it belonged to them. Telegram delivered in plenty of time to meet Mr. Helloorf at the train."

"Telegram addressed to Miss Lillian Neese—No phone (City or RFD) called all hotels, rooming houses, schools, etc., looked in directory—nothing there, Wesley Nees owning a farm near Hitchcock, S Dak. Called Hitchcock and said no Phone, but thought he owned a farm near there, so I called towns near Redfield and located a Miss Lillian as daughter of Wesley Neese, living near Tulare, S. Dak.—Message delivered O. K."

Nutty

THIS story comes from Denver:

A couple of painters were working on the building in which our operating room is located and happened to be painting around the windows during a period when there was considerable wire trouble necessitating great activity on the part of the wire chiefs. The younger of the two men seemed to be much interested in the antics of "MJ," who was being called from one circuit to another, particularly as he heard the calls, "Come to 'Frisco," and in a few moments "Come to Salt Lake." He was watching "MJ" closely through the transom when "Pop" Seaton lost "CB," and yelled out, "Come to New York." "Mike" was feeling a little peeved and yelled back, "I've been there ten minutes." The painter called his partner to the transom and pointed in, saying, "Say, you know they're a bunch of nuts inside?" His partner looked for a moment as "Pop" and "Mike" were pointed out, and said, Whereupon the first one replied, "That bird (pointing to "MJ") was in Salt Lake four or five minutes ago, and in San Francisco a couple of minutes ago, and the damn fool now thinks he's been in New York for ten minutes. Waddyer think of that?"—*Postal Telegraph.*

International Radio Regulations

A SMALL committee of experts, summoned by the League of Nations met in November at Geneva and came to the conclusion that a conference to draw up international rules for radio communication, to which not only representatives of Governments, but also of private undertakings, should be invited, should be summoned by the League towards the middle of 1924. The proposed conference would draw up regulations regarding radio-telegraphy and telephony, including broadcasting, for which there are at present no international regulations whatever.

Interesting Telegraph Book

FOUR hundred commercial and railroad telegraph operators sent in specimens of their penmanship in a contest conducted by a New York magazine. The prize-winning specimens have been published, together with samples of the penmanship of famous old-time telegraphers who were noted for their "copy."

Copies of the handsome library edition of the book "Telegraph Operators' Penmanship" may be procured from TELEGRAPH AND TELEPHONE AGE for $1.00 per copy.

Not Washable

A boy bought from a local dog-dealer a spotted dog.

The next morning it was raining, but he took the dog out into the woods; however, the rain was too much for him. It washed the spots off, so he trotted the dog back to the dealer.

"Look at this animal," he said. "The spots are all washed off."

"Great guns, boy!" he replied, "there was an umbrella to go with that dog. Didn't you get the umbrella?"

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This little book will greatly benefit every reader. Its simple lessons will show you how to make your life a happy, wholesome, successful one. You will become surrounded by loving friends and you will delight in doing for others.
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Telegraph and Telephone Age

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CHANGE OF ADDRESS.—In ordering a change of address the old as well as the new address should be given.

REMITTANCES to Telegraph and Telephone Age should be made by draft on New York, postal or express money order, not by cash loosely enclosed in an envelope.

ANY NEWSDEALER in the United States or Canada can obtain copies of Telegraph and Telephone Age through the American News Company, New York.

BACK NUMBERS of this journal three or more months old will be charged for at the rate of 25 cents per copy.

No. 5 NEW YORK, MARCH 1, 1924 Forty-second year

CONTENTS

PAGE

Engineering Literature. By Donald McNicol 100

The Romance and History of the Electric Telegraph. (Concluded from page 79, February 16th issue) 104

Hints on Antenna Construction. By Frank Conrad 108

Behind the Scenes During Radio Broadcasting 109

Annual Report of Mackay Companies 110

Frank E. Maize Appointed Electrical Chief. Built First San Diego Telephone Lines. Haskin's Galvanometer 111

Editorial Comment— "Conscience and Success" Well Received. Telegraphers for Signal Corps. Seeing by Wireless. King George and Argentine President. Western Electric Company 112

The Railroad—Telegraph and Telephone Section of the American Railway Association. A Deserved Promotion. Unemployed Wireless Operators 115

Dinner in Honor of John L. Merrill 116

Improvident Operators. By R. W. Ledwith. South American Cables. Greenland Radio Station 118

Personal Postal Telegraph-Cable Company. Radio Corporation of America. Chile German Radio Station 119

Western Union Telegraph Company. Robert D. E. Rowe Dies in Newport, Ky. 120

From Radio Music Fund Committee. Mastering Phillips' Code 121

Western Electric Out to Enlarge Facilities. Mary and Doug Capitulate on Broadcasting 122

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ENGINEERING LITERATURE

A Critical Review of the Tendencies in Technical Literature, with a Statement of Some of the Problems of Publication

By Donald McNicol
Fellow, A. I. E. E.
Chairman Publication Committee

In a recent broad discussion of the problems of engineering colleges, Gano Dunn, past president of the Institute, speaking of the training which should be given students, said: "Ground them thoroughly in the English language, a lack of command of which in writing and speaking is the greatest single defect in the college training of most engineers. It is not enough for an engineer to be skilled; he must make his skill prevail, and the power and culture that come from familiarity with English are tremendous forces in the success of an engineer."

To this might be added the thought that there is no writer of engineering literature who has not gained handsomely from his faculty of writing. The ability to write aids largely in the task of getting the most out of the writings of others. Through reading the student becomes a scholar.

Physicists and engineers engrossed in the task of furthering scientific progress, or of applying the fruits of science to modern commercial advancement may well pause for a moment to inquire into the growth of technical literature; the tendencies of this literature, beneficial and of no benefit, and with a view to the utilization of new forms of literary expression and new ideas of publication, if such have come into successful use in other activities and would be applicable to the reporting of engineering progress.

A good carpenter looks to his tools. The china merchant must have for sale not only good china, but must have dependable crates to carry the china to its destination. The best of agricultural products may rot in the fields if there is not available a vehicle by means of which these may be moved to market.

Vehicles of thought are the written and the spoken word.

The good carpenter, upon occasion, ceases building while he takes stock of his tools; sharpening, cleaning, replacing or discarding where advisable.

Science is a product peculiarly dependent upon a vehicle to carry it forward. Except in rare instances forward steps in science have been of minute measure, and the vehicle is the literature in which is recorded the discoveries of physicists, research engineers and inventors.

Publishers of technical literature are at all times confronted with a variety of problems more or less pressing. This applies to the publishers of commercial periodicals as well as to engineering societies whose periodical journals are the main points of contact with large memberships.

In what follows it is my intention to present only some views and impressions which have come to me on the general subject of engineering literature during the past few years while it has been my privilege to be in close touch with the publication problems of the Institute.

Practically all we know about electricity and electrical engineering is a matter of records which constitute the existing literature of the science. All that engineering students learn about electrical engineering in the years immediately ahead is now available in text books, technical journals, papers or transactions, or will be written and so recorded in the interim.

The responsibility, therefore, which rests upon those who will prepare the lessons—do the writing—is one which devolves proportionately upon those called consecutively to direct engineering thought and engineering works, whether as managers, of industrial organizations, officers of technical societies, teachers in engineering schools, editors, or as directors of research.

Style in Writing

Writers of engineering literature are situated favorably to contribute measurably toward stemming the growing misuse of English in this country. Engineer writers deal with topics which may be made clear to readers only by the employment of exact phraseology. The supreme quality of a language is precision of meaning, each word having a definite and unmistakable significance.

An observing editor has said that "The simplest way to popularize science is to record results only. To popularize the processes whereby the results are obtained, to explain the underlying theory of the processes in language that a technically uninformed person can understand, requires not only real scientific knowledge, but a gift of presentation with which few are endowed."

To this view most editors will subscribe without reservation, but it is possible that the engineering societies with large memberships have here an overlooked opportunity of educational value. Is it not possible that thought given to the training of engineer writers would in time relieve the demands upon gift and endowment?

An outstanding and ever present problem before the publishers of the larger technical and trade journals is to induce subscribers to read the periodicals—to do more than glance hurriedly at headlines. It is possible that should wider reading of technical journals be brought about that this would follow the discovery that stories containing data, descriptions of works and operations, and details of construction may be presented in sentences embodying the beauty as well as the utility of the language.

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I have in mind a comparatively recent technical book which had an unusually large sale and in which the author followed a style so attractive that the reader was inveigled into romping through the pages as in his youth he devoured page after page of Nick Carter. In one spot the author, with a view to impressing upon the student the necessity for thoroughness plus speed in effecting an operation, launches the point with the quotation: "If t'were done when t'is done t'were well t'were done quickly."

So far technical literature has been able to accommodate without contamination only one book in perhaps one thousand employing a style of this order. Yet, the venture from the publisher's viewpoint usually is quite a success.

Books employing pioneering styles which have found their way into good society on bookshelves include Faraday's "Chemical History of a Candle" and John Mills' "Letters of a Radio Engineer to His Son."

The intensely practical age through which we are passing has been served by a long line of "How to do it" books which publishers have favored because of the demand—the ready market. The "How to do it" book is not always a good presentation of engineering principles nor is the literary product always a credit. The sales success of this type of book is a symptom—an index of haste to attain quick results. The writers of such books aim to interpret science for those who unavoidably or avoidably missed engineering education, and for those who would take all possible short cuts to an average working familiarity with scientific knowledge.

This would perhaps be an unobjectionable tendency in learning if the students of these books constituted a class comparable in objective with the dilettante in art, but often in industry we find in the draughting room and the test room graduates of the "How to do it" books—and schools of the same order—because none other is available.

It may be that in an age of inventions the practical arts, under pressure of economic demands, perforce lead the literature. But, should the forward steps in science become smaller and inventions less revolutionary in character stimulation might be accelerated by the existence of more complete and higher forms of engineering literature than those created under stress such as that experienced during the past three decades.

In time to come should real advance appear at a standstill it is possible we may have engineering works resembing in purpose literary productions such as "Vanity Fair" and "Uncle Tom's Cabin."

In setting up a perspective it is well to remember that literature as a tool, as a means toward an end is a worthy subject for consideration by forward-looking engineers.

Rules and theories in writing are the Chinese Walls of the brain. Must we say that technical writing is excepted: That technical stories may be written only in a certain definite style, uniform, prosaic, dry, and without prosody or human interest?

Since the days of Portia, and before, words have been the tools of the lawyer. With words the advocate constructs mental pictures designed to impress the listener sympathetically toward a definite idea.

In agriculture we have the dirt farmer and the book farmer. Each prides himself upon his classification, but rapidly the two classes are fusing. In time, survival will find professional agriculture under the management of a book-dirt generation of farmers. In engineering much the same classifications exist; in the theoretical and the practical engineer. As a wit has said, we have our "stationery" and our "stationary" engineers.

Rigidity of style in engineering literature gives us volumes of Transactions which we like to think will be a credit to us a hundred years from now, but it is possible that less rigid rules would permit of hastening the day when the practical engineer shall become theoretical and vice versa.

Throughout the pages of engineering literature, now historical, may be found many dignified and solemn statements which, read in the light of subsequent scientific developments, provoke enjoyable chuckles because of the grave and erudite manner employed to set forth hypotheses which in fact were wide of the truth.

It may not be wise to conclude from this that engineering writers should standardize two styles—one to be used to set down indisputable facts, the other for use when presenting ideas which are open to question and which if set down in playful paragraphs would carry the suggestion that the writer wrote "with his tongue in his cheek."

In our country we have cherished the thought that the people as a whole are on familiar terms with advances in science, as a result of the fact that our technical, scientific, and "popular science" periodicals are read by three and one-half million persons. Still, when Dr. Einstein attempted from our rostrums to state a few plain truths in words having definite meaning he was moved to commiserate with us with respect to the average ability of our people to understand things.

There is a vast difference in the audiences of engineers who write technical papers for journals maintaining high standards of engineering probity, and those pioneering spirits who endeavor to supply the science hunger of the layman by giving him stuff with color, couched in terms which he who runs may read. Out of these extremes may come a style which will be common, embodying modifications and compromises; although it is perhaps well to realize that the ideas of popularizing a knowledge of scientific principles, and popularizing a knowledge of the uses of electric devices, are separate and distinct.

In classical literature the style usually follows the mood of the matter. In engineering literature must the style be the same regardless of the matter? Or must we conclude that in engineering literature the matter always is the same?

Scientific papers, in the lay view, are of a severely didactic nature, employing Babylonish terminology and requiring trained minds to understand them. An

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engaging rhetoric might bring to these subjects a wider reading, but is that not what the semi-technical journals now present in their diluted science?

In engineering literature the highest development we have of the literature sometimes referred to as didactic are the instruction books issued by the large correspondence schools. These, also definitions, specifications, etc., are set up in the simplest words applicable. Here the utility of the language is employed to the total exclusion of its euphonious possibilities. In these writings there is little need of sugar-coating— the reader almost invariably is under the urge of necessity and has little thought for or expectation of allurement. Indeed, less prosaic rhetoric might fail where the rigid style succeeds— the mood of the instructor is conserved.

The writer occupies the vast domain between the laboratories and the multitude of those who would know. He must reach in and bring forth the discoveries of the physicists; must translate these discoveries into understandable terms, and must, without loss of truth, present his subject to the multitude at opportune moments and under acceptable auspices.

The number of trained scientists is small compared with the multitude who would or should have a knowledge of scientific progress. Is is not important that science should be understood by the multitude? Can the scientist interpret science? Is the number of gifted writers who understand science sufficiently large to interpret science to the multitude? Interpreters have a way of being creatures of occasion.

The masses have their religion supplied to them in song, their history in pageant, and much of their culture in music, picture, sculpture and poetry. The artists are the interpreters.

Sculptors and painters already have tried their skill at interpreting science. They may continue. H. G. Wells, Rudyard Kipling, Camille Flammarion, George Stirling, John Masefield and Samuel Butler each in recent years has sensed an opportunity to interpret science through tales and poems.

Masefield, in a sonnet, says:

I could not sleep for thinking of the sky,
The unending sky with all its million suns....
Or, in the one that opens thus, in bio-chemical fashion:

What am I, Life? I think of watery salt
Held in cohesion by unresting cells.

What of the influence of the broadcast radiophone?

What the future will bring in the way of extensions of radio broadcasting may only be guessed at. In the present early tryouts of topics from existing experimental stations it appears that talks on scientific subjects are sufficiently popular to warrant their continuance. In these pioneer days of the radiophone when talks on serious subjects are broadcast it is thought necessary to sandwich these between renditions of popular music, but a time may arrive when the lecturer will have the students of the whole continent as an audience, and in that day manner, style and mood will play the same important parts these factors play on more restricted rostrums.

Should it develop that in broadcasting didactic talks are more successful when the lecturer departs knowingly from sing-song style and from dry text there will be opportunity for a readjustment of ideas related to engineering English. A danger may be that radio lecturers will be inclined to "talk up to" their subjects. It was Aristotle who said that the style should be lowered or raised according to the subject. Further: "Style will possess the quality of being in good taste if it be expressive at once of feeling and character, and in proportion to the subject matter. This proportion, however, is preserved, provided the style be neither careless on questions of dignity, nor dignified on such as are mean; neither to a mean word let ornament be susperadded. otherwise it appears mere burlesque."

Growth of Electrical Literature

Electrical literature in the United States dates from the publication in Philadelphia, in 1819, of Tiberius Cavallo's "Elements of Natural and Experimental Philosophy." This work, written during the time that Humphrey Davy, Frances Ronalds, Schweigger, La Place, Arago, Ampere and Oersted were uncovering secrets of all prior time, discoveries in electricity and magnetism.

"Electricity," a book published by John Farrar, in 1826, was widely read in this country. It was largely a translation of the published writings of J. B. Biot, France, 1816 and 1824.

A third book which had wide reading in America was "Treatises on Electricity and Magnetism and Electro-Magnetism" by P. M. Roget, London, 1832. This work presented an excellent review of the state of the knowledge of electricity at the time Morse was at work on his electromagnetic telegraph.

The first strictly American popular book on Electricity was "Davis' Manual of Magnetism" published in Boston in 1842, by Daniel Davis, Jr.

Then followed a succession of books on Telegraphy which served to inspire study and experiment. In 1879 George B. Prescott, New York, wrote a comparatively large book entitled "The Speaking Telephone, Electric Light and Other Electrical Inventions" which work was the forerunner of the long list of books which followed dealing with advances in electric development.

The advent of large corporations had as one result the limiting of the field for independent writers of technical books, due to the fact that electric companies early began the compilation of data applying specifically to their own operations, this material being published in handbooks, instruction books, catalogs, etc., for free distribution to the individual company's employees.

This tendency increased so that as early as the year 1910 it was apparent that the publication of electrical books for general circulation was not by any means keeping pace with the increase in the number of men engaged in electrical pursuits.

During the past twenty years, also, the growth of

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filing systems wherein may be deposited for quick reference, papers, clippings and reports on classified subjects, has had the effect of making it extremely difficult to write a new book on a technical subject which would be as complete as the information on the same subject stored in the files of engineers directly interested.

Engineering libraries available to the independent student consist mainly of books, and a time has arrived when the bookworm of the libraries has open to him on any specific subject a limited and more or less out of date literature compared with what is available on the same subject in the technical files of corporations and of a few individual engineers.

This situation sharply emphasizes the importance of inquiring into the grade of the material which goes into filing systems. If technical periodicals are to be clipped to build up files of data on stated subjects it is at once apparent that the material should be accurate and dependable, and that the less there is of duplication (reprinting) the less will filing systems be cluttered with duplicate data.

A library of books is a thing of beauty as well as of utility. The book itself is a convenient unit. Books published in large numbers are common property, available to all, and it is still another evidence of the growing complexity of life to witness the passing of the book as the main source of technical information. Corporations and files are creations of evolution.

The Institute has continued over a period of forty years to publish technical papers covering all departments of electrical engineering, and it is natural that in view of the vast changes and alterations which have in this period taken place in transportation government, education, social conditions, etc., that a time would arrive when both the "matter" and the "manner" of engineering literature would be subjected to close scrutiny by engineers in close touch with historical perspective and world progress.

As time goes on our store of literature increases. The task of the student who searches through the literature of a subject becomes increasingly prolonged. Should the files increase proportionately in the next fifty years a situation might exist which would be serious.

There is now a tendency toward "outlines" and the Seven Foot Shelf. Outlines of History, Outlines of Literature, Outlines of Art, and Outlines of Science. This trend may hold the solution of the menace of vast accumulations of literature on given subjects.

A few scholars who have extraordinary capacities and the time for devouring endless tomes deplore these short cuts of omiscience, but as time and its productions pyramid, the engineer and the worker may come to view compilations and anthologies as boons.

To be well informed is becoming increasingly difficult. A time may arrive when consideration shall be given to constituting a Board of specialists charged with the duty of scrapping from reference libraries a large amount of material now catalogued and shelved. Future generations of engineers might then proceed unhampered by traditions and the dead weight of the past.

Until recently it has been not difficult for the engineer to acquire fairly definite ideas relating to the philosophy back of a law and to gain something of value in the way of a sensed professional association with the early philosophers and discoverers. Should modern systems of general education markedly influence the production of engineering literature it is probable that much of the inspiration experienced by past writers will be lost and that economic performances will form the criterion of achievement along literary lines as along other lines of endeavor.

Duplication of Stories

A subject which some day is likely to receive attention is that of the very great amount of duplication of technical literature on single subjects. If the task of providing scientific literature could be organized so that each division of the arts would be covered continuously as new developments take place, the same constituted agency carrying the literature forward in point of time, it would be possible to avoid a deal of the expense of duplication.

Now, the weekly and the daily newspaper, popular magazine, trade journal and house organ reprint millions of words yearly when it would seem that the economical thing to do would be for all publications, other than the one of original source, to make brief reference to articles on special subjects, stating in what periodical published.

It is as if each periodical were a voice with nothing particular to say, but willing to speak on any subject so long as there are paying listeners—readers.

The village artisan subscribes for the Home Clarion and looks to it to keep him posted on all subjects. The Clarion responding to opportunity becomes a market for an increased amount of syndicated material abstracted by hack writers little qualified to send forth accurate stories on technical subjects.

Tongues the world over wag continuously. Millions of words are spoken daily which do no more than supply vocal exercise. But, useless and purposeless spoken words may die aborning. Not so with the printed word. The printed word lasts as long as the paper on which it is printed. There is this difference between the spoken word that is useless and the written word that is useless. The latter has a high cost of production; lives long to mislead and confuse, and in its reading consumes ages of time which might be employed in better ways.

Writers who are on speaking terms with rejection slips have realized that in recent years the commercial technical journals are to an increasing extent following the policies favored by the higher class literary periodicals in so far as policies concern the acceptance of matter for publication.

From year to year the products of the will to write has increased. There is brought to the mill more grist than can be accommodated in periodicals

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conducted on an economical footing.

Much matter is left over the disposition of which is an embarrassment, in more than one sense.

The situation, together with editorial expediency, as trade winds blow or cease to blow, has resulted in a considerable portion of the matter accepted for publication being written on order or assignment.

The monthly journals of the large engineering societies appear to be the last open road for the individual writer who upon his own initiative and on his own time prepares a good story on a subject in which he is interested. Engineering journals are successful in a degree related to whether or not these stories are of interest to a sufficiently large number of their readers.

Those responsible for the character of material published in Engineering journals have no easy task. Their critics are numerous—all interested, not only in the journal but in the institute which the journal represents.

An element of the task is; not to discourage individual initiative. On the other hand, present costs of publication are such that the economics of the situation must be kept in view.

There are economic and mechanical limitations to the size of a periodical. A journal to be popular and to secure wide reading must be attractive in form and contain matter of interest to a large number of readers engaged in related activities. The subject matter must be spread out so that all corners of the field are covered without intervals of neglect too prolonged.

As the problems of Engineering Society journals approach in character the problems of commercial journals we are likely to see readjustments of editorial policies.

We may yet reach a stage where the managements of engineering journals functioning through institute technical committees will adopt a modification of the assignment system, whereby members of the Engineering Society will have subjects assigned to them in which they are recognized specialists—subjects which the managements know to be timely and of current value.—*American Institute of Electrical Engineers.*

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The Adventures of a Boomer Operator

"The Adventures of a Boomer Operator" is the title of a popular story book placed on the market by Marcus E. Smith, a well known knight of the key now living in Wyoming. The book is humorous and is designed for telegraph operators. It is a book of fun from cover to cover and there is a laugh in every line. The book is bound in a substantial cover and is fully illustrated. It consists of ninety-four pages and measures five and a half inches wide by seven and three-quarter inches in length. The book is well worth the dollar asked for it. The price is $1.00 per copy mailed parcel post to any point in the United States and $1.15 per copy to Canadian points. Copies may be obtained from Telegraph and Telephone Age, 253 Broadway, New York.

The Romance and History of the Electric Telegraph

(*Concluded from page 79, February 16th issue*)

Toward the end of 1836, when the mechanical dial instrument was nearly completed, the inventor's funds were running low and he was faced with the necessity of either drawing upon the resources of his friends or endeavoring to turn his apparatus to immediate profitable use. He chose the latter course, and in January, 1837, submitted his proposal to the Liverpool and Manchester Railway Company, who required a ready means of signalling through the tunnel between Edge Hill and Lime Street, Liverpool. Cooke's instrument, which was designed to give 60 symbols, was inspected and considered to be too complex for the work as only a few elementary signals were necessary to meet the Company's requirements. In these circumstances it was suggested that the mechanical telegraph should be modified to give fewer signals, and immediately on his return to London Cooke ordered four instruments of more simple design to be constructed. Two of these were ready in the following April, but were not accepted by the Railway Company as they had, in the interval, installed a pneumatic signalling system in the tunnel.

Undeterred by this disappointment, Cooke continued his labor with characteristic vigor. In the course of an experiment which he undertook for the purpose of proving through what length of wire the electro-magnet would act in operating the detent, Cooke was astonished to find that the effect was unreliable even with only one mile of line in use. Recognizing his own limitations in the theoretical branch of the subject, Cooke thereupon sought the assistance of Dr. Faraday, with whom he was acquainted, and by following that leader's advice a partial improvement was secured. Dr. Roget was also consulted in the matter and he referred the inventor to Professor Wheatstone as one who had an expert acquaintance with the subject and who also possessed a large quantity of wire at King's College, which, also possessed a large quantity of wire at King's College, which it was suggested, might be suitable for further experiments with the electro-magnet. The first meeting of Messrs. Cooke and Wheatstone took place at the latter's residence in Conduit Street on February 27th, 1837, and the acquaintanceship thus started resulted in a partnership extending over many years, which had an almost immediate and intense effect on the development of telegraphy in this country. Professor Wheatstone had long been engaged in conducting electrical experiments to ascertain the distance to which signals could be conveyed with the ultimate view of applying his knowledge to the purposes of an electric telegraph. He had shown a reproduction of Schilling's telegraph at King's College to illustrate his lectures on the subject as early as 1835 and had invented a "permutating Keyboard." Wheatstone also contributed largely to the general knowledge of the laws of electrical action and especially gained dis-

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tinction by his brilliant researches into the determination of the velocity of the electric discharge, to accomplish which he introduced the revolving mirror which has since proved of the utmost value in solving many physical problems.

Charles Wheatstone (afterwards Sir Charles), was the son of a music-seller and was himself a musician of no mean order. He came to London at the age of twenty-one with the intention of setting up as a maker of musical instruments, for which purpose he studied the science of acoustics and in 1823 published a paper entitled "New experiments in sound."

Curiously enough, Wheatstone attempted to turn to account the discovery that mechanically produced sounds might be transmitted to a considerable distance through solid wires or rods by suggesting the establishment of communication through very long lengths of wire between distant towns, and he refers to his limited experiments in this direction as "telephonic" trials. A memoir on the subject of the "Transmission of sound," by Professor Wheatstone, was published in the Journal of the Royal Institution for 1831. Realizing at length that his ideas on the matter were not practicable, he turned his attention to the application of electricity to methods of telegraphing.

In 1834, Wheatstone was appointed Professor of Natural Philosophy at King's College, London, where he at once established a reputation as an investigator of exceptional genius.

Messrs. Wheatstone and Cooke applied for their first patent in May, 1837; this was sealed on June 12th, following and a specification of the apparatus was filed on December 12th, 1837. The system was explained to Robert Stephenson and the Directors of the London and Birmingham Railway Company, who were so impressed with the adaptability of the invention to railway needs, that they decided at once to give all facilities and to bear the expense of practical trials on a small scale. For the purpose of the experiment early in July, 1837, they placed a large building at Euston Square, 165 feet long by 100 feet wide, at the disposal of the inventors. The wires were run round and round the walls to add length to the circuit and then a route was taken to the Stationary Engine House at Camden Town, a distance of about 1¼ miles. The instruments used in this trial were an improved mechanical telegraph and a needle instrument with horizontal needles. The result was so satisfactory that within three months the London Directors recommended the adoption of the telegraph and proposed to lay the wires from London to Birmingham, but opposition on the part of the provincial Directors caused the scheme to be abandoned.

In the following year a line of telegraphs, which was the first system used for commercial purposes, was installed between Paddington and West Drayton, a distance of a little over 13 miles. Five wires were insulated with cotton and indiarubber and drawn through iron pipes, which, on some parts of the route, were buried, and at others were raised above the ground. During wet weather, insulation faults developed and caused so much difficulty that other means of connecting the stations had to be devised. This led to the introduction of overhead lines supported by poles and insulated at the points of suspension, thus following, with little variation, the methods adopted by Dr. Watson in his Shooter's Hill experiment. The Paddington-West-Drayton circuit was subsequently extended to Slough.

It is unnecessary to refer in detail to the many improvements that rapidly succeeded each other during the next few years. Suffice it to say that the multiple needle telegraph was soon rendered obsolete by the introduction of double needle and single needle instruments, which were more efficient and less costly. Instruments of these types were first used on the Blackwall railway in 1839.

Cooke's "dial," or mechanical telegraph, never came into general use, but Wheatstone invented a pointer telegraph, in dial form, examples of which still survive on minor circuits. Before leaving the subject of dial telegraphs, it may be mentioned that the difficulty experienced in working the alarm signal electro-magnets over long distances resulted in the invention of the first relay, the weak line current being caused to deflect a needle, extensions of which dipped into small cups of mercury and closed a local circuit.

The drawings which accompany Messrs. Wheatstone and Cooke's first patent prominently show a diamond-shaped dial with five needles. This has, not unnaturally, been assumed to represent the actual apparatus used in the early applications of telegraphy, and authors have reproduced the drawings in that connection, but from Mr. Cooke's own writings it is clear that this "hatchment" dial, as it was called, was never used on any of the working circuits.

In 1850, a law suit was tried at the Guildhall between the Electric Telegraph Co. (who were the purchasers of Messrs. Wheatstone & Cooke's patents,) and Messrs. Brett and Little. The defendants in the case made it one of their chief arguments that the "hatchment" dial and permutating keyboard had never been used. This is confirmed by Mr. Cooke's statement that "Wheatstone's 'hatchment' instrument and the permutating keyboard, to be seen at King's College, and only there, never came into practical use."

In April, 1838, just before the Paddington to West Drayton experiment commenced, Messrs. Cooke and Wheatstone patented, in addition to other inventions, another four needle telegraph in which the keys were simplified, and the apparatus made suitable for intermediate station working.

It is a matter of regret that the two partners, so eminently suited by their varied qualifications, to assist each other in developing their electrical plans, had several unfortunate controversial exchanges during the course of their collaboration. The principal cause of contention was the conflicting claims of the inventors as to the relative importance of the part

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played by each in introducing the electric telegraph into this country. In 1841, it was decided to refer the questions to the arbitration of Professor Daniell and Sir. M. I. Brunel. Their award stated that:

"While Mr. Cooke is entitled to stand alone, as the gentleman to whom this country is indebted for having practically introduced and carried out the Electric Telegraph as a useful undertaking, promising to be a work of national importance; and Professor Wheatstone is acknowledged as the scientific man, whose profound and successful researches have already prepared the public to receive it as a project capable of practical application; it is to the united labors of two gentlemen, so well qualified for mutual assistance, that we must attribute the rapid progress which this important invention has made during the five years since they have associated."

The first joint patent, No. 7390, dated June 12th, 1837, comprised:—

(1) A five needle telegraph, using 5 wires (or 6 if each needle is to be separately deflected.)
(2) A four needle telegraph, using 5 wires (the fifth being a common return.)
(3) Methods of insulating wires.
(4) Sounding alarm in distant places.
(5) Sounding alarms in distant places by the aid of an additional voltaic battery. (Relay.)
(6) Fault detector.

The April, 1838, patent No. 7614 covered—

(1) The addition of intermediate stations with facilities for transmitting and receiving telegraphic signals.
(2) Portable telegraph instruments for temporary conection to line wires.
(3) Protecting wires by drawing into tubes or pipes, and other less important matters.

In September, 1842, a patent was granted to Mr. Cooke for methods of suspending and insulating wires on posts of wood or wood and iron. The insulators consisted of glass tubes, glazed pottery ware or split goose quills fastened to the wire with white lead and twine.

The specification also included a proposed method of communication between any carriage in a railway train and the engine driver.

Other patents relating to dial telegraphs and auxiliary apparatus of various types were from time to time secured by the inventors.

The national importance of the work performed by Messrs. Cooke and Wheatstone was fittingly recognized by the Society of Arts, who presented an albert gold medal to each of the inventors in 1867.

The Morse System.—To keep in view the development of telegraphs in other countries we must go back to the year 1832 when Dr. Jackson, of Boston, and Mr. Morse, a New York artist, were returning to America as passengers on board the packet ship Sully. Jackson had been attending lectures on electricity at the Sorbonne in Paris and was taking home an electro-magnet and two small batteries, which, however, were stowed away with the baggage and could not be used during the voyage. In the course of conversation among the passengers, Jackson mentioned some of the wonders of electrical action and described methods by which it might ultimately be possible to convey intelligence to a considerable distance. Morse became interested in the subject and conceived the idea of employing an electro-magnet, which, by the use of a suitable code of signs to represent letters and other symbols, would enable a moveable armature, controlled by the current to record the transmitted signals on a strip of paper. There was nothing new in the suggestion, for in 1830 Booth, of Dublin, proposed a means of telegraphing by causing marks to be made by the fall of the armature of an electro-magnet. Jackson does not appear to have been acquainted with the many systems of telegraphs that had been invented prior to that time, consequently the information he supplied to Morse was absorbed by the latter as being applicable to entirely new purposes. The many proposals for using voltaic electricity for the transmission of signals were all limited in their application by the want of a battery which would remain constant for more than a few hours under working conditions. This fundamental requirement was well known to electricians, and it was generally recognized that until a more constant source of energy was discovered there was no prospect of establishing a successful system of voltaic telegraphs for business purposes. Morse was not an electrician, and he had little or no knowledge of the subject beyond what was communicated to him by Jackson, but on his arrival in America he occupied his leisure hours, in the intervals of his duties as an artist, in the construction of the various parts of his projected telegraph. The first model was roughly fashioned out of a canvas stretcher, such as is used by artists, and the works of a clock which served to pass a strip of paper underneath the pen or pencil, which, under the influence of an electro-magnet, was contrived to produce the signals of the code adopted. Morse was at first of the opinion that the signals could not be formed with sufficient regularity by hand. He therefore devised a series of types which were set up in a narrow frame and carried along by a hand-operated roller, which caused a transmitting key to close the battery circuit as each projection of the type came into position.

It will be observed, that the types consisted of two series, the upper row representing the numerals 1 to 5 with a small type used for spacing, and the second row representing numerals 6 to 0. The types had from one to five projecting cogs on the upper surface, the figure selected being governed by the length of the space between one group of signals and the next. The longer spaces separated complete groups of figures. When the circuit was closed, an electro-magnet armature attached to the swinging pendulum, which carried the recording pencil, was attracted and marked V-shaped signals on the moving paper tape. To translate the message, which had been

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coded in figures for transmission, a special dictionary was used, in which each word was indicated by a separate number.

Morse completed this working model of his recording instrument in 1835, but did not progress very rapidly with its development, as two years later, in October, 1837, when he made out a caveat he described it as a "rude apparatus" and stated that the invention was not sufficiently advanced to enable him to apply for a patent. It may be explained under the American patent laws, an inventor by disclosing the distinguishing features of his invention could claim protection of his right and be given time to mature the same. In the caveat, Morse claimed protection for one year for a "method of recording permanently electrical signs, which, by means of metallic wires or other good conductors of electricity, convey intelligence between two or more places." There is no reference to any system of strengthening the current by the employment of a local battery introduced by the action of a relay or other apparatus, although certain writers state that Morse invented a form of relay in 1836, *i.e.*, prior to Cooke and Wheatstone's arrangement. If such were the case, it is inconceivable that no reference to such an important and valuable instrument should appear in the original application for protection, but it is doubtful if anything more material than the bare idea existed.

Even if such a claim had been made, Messrs. Cooke and Wheatstone, by the filing of their patent in June, 1837, would still be entitled to the credit of being first in the field with the published description of a working apparatus. Professor Henry, of Washington, stated that he saw Cooke and Wheatstone's instrument in actual use at King's College, London, early in April 1837. Henry was especially interested on a different plan for achieving a somewhat similar result in connection with the ringing of church bells in the apparatus, as he had himself devised a method from a distance. It will therefore be seen that the idea of using a relay was not confined to one or two brilliant minds but was generally known to be an essential to long distance electrical working, and the title to be regarded as the originators of the earliest practical method in respect to telegraphic use rests with the British inventors. Morse's American patent for the relay and local circuit was not granted till 1846.

By the autumn of 1837, Morse's telegraph instrument was sufficiently improved to admit of its being exhibited at the Cabinet of the New York University, where it was operated through 1,700 feet of wire, the first word being transmitted being "Eureka." The American telegraph was not brought into practical use until June, 1844, when, after surmounting numerous difficulties, a circuit was successfully worked between Baltimore and Washington, a distance of 40 miles, Congress having meanwhile appropriated a sum of $30,000 for the purpose of testing the telegraph. The opening sentence on that occasion was "What hath God wrought?"

Morse's first patent was taken out on June 20th, 1840, the invention was called the "American-Electro-Magnetic Telegraph." On January 15th, 1846, the patent was surrendered on account of alleged defects in the specification and a new patent was also surrendered on similar grounds.

In his later apparatus, Morse ceased to use the type-setting method and introduced a hand-worked key, by the manipulation of which the dots and dashes of a code were transmitted to line; the pencil in the receiving instrument also gave place to a style which embossed the signals on the paper strip. When the apparatus came into general use, it was not long before the telegraphers found that they could read all the signals from the clicking of the armature and it became the practice to receive messages by sound and to ignore the recording apparatus. At first this method of reception did not commend itself to the supervising officers, but when it was found that the business was conducted equally well by sound reading as by transcription from the paper tape the system was developed and instruments were manufactured without the recording portion.

It is said that Morse's earlier relays weighed 158 lbs. each and required two men to carry them. The reason for using such huge electro-magnets arose from the assumption that as fine wire windings caused the current in the circuit to be weakened this effect would be avoided if the wire used for winding the bobbins was made of equal cross-section to that of the line wire. These large relays were only used for a few weeks and were then replaced by smaller instruments wound on the plan introduced by Professor Henry.

Reviewing Morse's work in the development of telegraphy, it may be said that although he made no original discovery in electricity or magnetism, he was endowed with all the qualities of a successful inventor, including imagination, foresight, constructive ability, enthusiasm, perseverance and business acumen. In addition, Morse was fortunate in receiving much valuable assistance from such eminent scientific experts as Professors Gale and Henry, and also from his partner, Mr. Vail.

There has been much controversy as to the position occupied by Professor Morse in connection with the introduction of electric telegraphs. Some writers boldly assert that Morse was the one and only inventor of the first electric telegraph. This opinion is epitomized in the doggerel lines which appeared in an American paper at a time when the subject had become a national topic:—

"That steed called 'Lightning' (says the Fates),
Is owned in the United States.
'Twas Franklin's hand that caught the horse;
'Twas harnessed by Professor Morse!"

Against this may be quoted the generous statement of Dr. Turnbull, of Philadelphia, who, writing in 1853, said:—

"A strong instance of the popular delusion in this country (America,) on the subject of the invention of the electric telegraph, is to be found in the abstract

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of the seventh census in Mr. Kennedy's report on Railroads and Telegraphs in the United States (p. 107):—

"It is to American ingenuity that we owe the practical application of the magnetic telegraph for the purpose of communication between distant points, and it has been perfected and improved mainly by American science and skill. While the honor is due to Prof. Morse for the practical application and successful prosecution of the telegraph, it is mainly owing to the researches and discoveries of Prof. Henry and other scientific Americans, that he was enabled to perfect so valuable an invention."

One hundred thousand copies of this report were published by order of the House of Representatives.

Commenting on the extract quoted above, Dr. Turnbull justly adds:—

"Now it has never even been pretended that American ingenuity has supplied anything toward the practical application of the needle or pointing telegraph, which is one of the various forms of the "magnetic telegraph," and confessedly the earliest of them all."

"The electric telegraph has been a long time in advancing to its present state. It is not the invention of one man or any set of men, nor of one nation, but of many nations, each adding their mite to the noble structure. Its history is based upon two of the most interesting of the physical sciences, those of electricity and magnetism. Had not these sciences been fully investigated, and thousands of laborers spent centuries upon them, we should never have seen an electric telegraph. Had not such men as Oersted, Ampere, Arago, Faraday and our own Franklin, spent their days in experimenting and nights in studying we should never have reaped the rich reward of their labors."

Hints on Antenna Construction

By FRANK CONRAD, *Assistant Chief Engineer, Westinghouse Electric & Manufacturing Co.*

THE element of the antenna which determines its ability to pick up or give off signals is its effective height. The term, effective height, does not mean the height from the ground connection to its topmost point, but is more nearly the average height from ground connection to the center of its exposed area. For an antenna consisting only of a straight vertical wire the effective height is about two-thirds its actual height, while for an antenna having a large horizontal top structure the effective height is very nearly the actual height. The only purpose of the horizontal top element of a receiving antenna is to give a greater effective height for a given actual height.

When a regenerative vacuum tube receiver is used the extent to which the signal can be built up by regeneration is independent of the antenna height if all parts of the antenna are equally exposed to the incoming signal. However, the amount of interference which is picked up will be proportionate to the height, and we must therefore, endeavor to select a location which will permit of minimum height.

As the lower part of the antenna will usually be more or less shielded it is necessary to make some compromise between signal strength and selectivity. For installation in cities a height of 20 feet with a horizontal top of the same length will usually be found ample for reception of distant signals. For use when interference is slight or in country districts the height may be increased to 30 feet. It is of course assumed that for strictly local reception an indoor antenna will be used.

It is unnecessary to use more than one wire for any part of the antenna and the size of this wire is unimportant. It should be well insulated at the supporting points and be spaced as far as possible from conducting objects. If the outer end of the top wire is attached to a tree, a break insulator is placed in the wire well outside the branches. This top wire should not be over or near any objects such as a metal roof, as the effective height of the antenna will probably be about the height of this top wire above the metal roof. If a supporting structure is available, a straight vertical wire without top horizontal part will be satisfactory, or it may extend in a diagonal direction from the side of the building near the receiving set to a point some twenty or thirty feet above on an adjoining building or other support with clear space between.

For the best results the ground connection should be made to some conducting area on about the same level as the receiver. A steam or hot water heating system gives a good ground. Avoid a long ground wire, as this gives height and lack of selectivity without compensating additional signal strength. This is an important point when the receiver is installed in an upper floor of a building such as an apartment. In this latter case the piping system of the building will furnish a good ground. Never run a separate wire down to the ground floor. The wires from antenna and ground where they approach the receiver should be separated as much as possible and the receiver should be placed as near as possible to the point where the antenna wire enters the building. The ground connection should be made to the nearest part of the conducting system which is to form the ground and it is often an advantage to connect to more than one conductor—such as the heating and water on gas pipes.

If your receiving set is not giving the results you think it should, look over your antenna structure to see how it meets the conditions outlined. Thus it is possible that by a change in the height you can obtain the selectivity desired or by a change in its location you can improve the strength of signals from distant stations.

G. CATHERMAN, manager of the Western Union Telegraph Company, Harrisburg, Pa., in remitting to cover his subscription for the year 1924 says: "You did exactly right in renewing my subscription to the Age. Its semi-monthly arrival is almost as important as the weekly pay day and one is as welcome as the other."

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Behind the Scenes During Radio Broadcasting

A. G. Popcke, *Studio Director, Station KDKA. Westinghouse Electric and Manufacturing Company.*

The operation of the studio during a radio program is very simple and not exciting, yet the performances are given under the closest supervision and governed by principles which have been discovered only by the most thorough research.

The studio is a room 20 ft. to 30 ft. wide and 15 ft. high. For the transmission of a pure tone by the microphone the studio must be free from echo and reverberation. To accomplish this the walls and ceiling are completely covered with heavy draperies and on the floor is a heavy rug.

The furniture is very simple: a piano, cabinets containing amplifying apparatus, the necessary switches and the chairs, music stands, and musical instruments that will be needed. The microphone is supported on an adjustable and movable stand so that it can be moved readily to suit the nature of the performance.

A number of signal lights to indicate when silence should be maintained are in plain sight. These are to warn all parties in the studio to keep silent when a performance is being announced and transmitted.

Adjoining the studio is an ante-room for the convenience of the artists, furnished with writing desk, registration book, comfortable chairs, and also a receiving set to pick up the performance being broadcasted.

The artists are scheduled to arrive about fifteen minutes before the program is to start, in order that they may become accustomed to the surroundings. This enables the announcer to check the program so it will be sent out without delay during the time scheduled.

The performers must be instructed regarding the proper position with reference to the microphone, for the relative positions of soloist, accompanist, and microphone are of fundamental importance in getting good results. Sound varies inversely as the square of the distance from the point at which it is produced; that is, at double the distance, the sound is one quarter as intense. Voices vary as to resonance, quality and volume. The characteristics of the various musical instruments differ in intensity. These facts make it necessary to exercise great care in properly placing musicians to produce results in your receiver comparable with those heard from the concert stage.

By continually studying the distances at which various classes of performers produce the best results; by noting the nature of the various instruments and voices as to volume and resonance; and by comparing the nature of the compositions and their accompaniment; valuable data has been collected which enables the studio director to place various classes of performances for the best results in transmission. Minor adjustments are frequently necessary after the first selection has been given, particularly to get the proper balance between the voice or instrument and its accompaniment.

Improper placing greatly reduces the effectiveness of good artists, and skill in placing appreciably improves the results with mediocre artists provided they are not off pitch. To the listener, the human element is entirely lacking and a performer's personality cannot compensate in any way for artistic shortcomings, the radio listener is impressed only by the music as he receives it.

The modulation meter is of great assistance to the studio director. This instrument indicates on a scale the intensity of sound transmitted. Sounds which give a reading of over 100 will not transmit without distortion, and, therefore, all music and speech must register below this point. If the meter reads too high, adjustments must be made either by increasing the distance between the performer and the microphone or by reducing the amount of amplification used. The speaking voice registers between 40 and 70; a soprano solo averages about 35 with peaks of 75 and 100 on higher pitches and louder notes. The accompaniment is about 15 to 25. During orchestral selections the meter usually reads between 20 and 80, averaging about 40.

Every program given is carefully checked on receiving sets by several persons, and a detailed report calling attention to any faults or imperfections is made.

The element of stage fright is usually present among new performers although they are singing in a small room with practically no visible audience. Everybody realizes that members of the vast audience concentrate their entire attention upon their hearing and that a slight slip will not pass undetected.

In the absence of applause there is nothing to give the performer any moral support, but if a hit is made, telephone calls and telegrams give this support in a very short time.

You have all noted a gradual improvement in the quality of transmission—this has been accomplished by continual research and experimental work by our large force of engineers, improving the various elements that constitute successful radio transmission.

To keep pace with the improvement in transmission strong efforts are being made by the radio broadcasting staff to make programs of ever increasing interest to the vast audience.

It is, of course, difficult to suit the tastes of all our listeners in—seeking entertainment some will pick vaudeville, some opera, some lectures, some drama, etc., and the tendency of some is to develop along narrow lines. The studio director tries to offer entertainment along all these various lines and the open minded will undoubtedly find entertainment as new ideas are constantly being developed.

Peace at Any Price

"What's the shape of the earth?" asked the teacher, calling suddenly upon Willie.

"Round."

"How do you know it's round?"

"All right," said Willie, "it's square then, I don't want to start any argument about it."

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Annual Report of Mackay Companies

THE annual report of The Mackay Companies presented at the February 15th meeting of shareholders at Boston by President Clarence H. Mackay, chronicles a year of remarkable advancement during 1923 and outlines a program for further development and expansion during 1924 of the Postal Telegraph-Commercial Cables System.

If the ebb and flow of communications is a reliable index of general business, both national and international, as many close students of economics believe, the report also contains an augury of an improvement in most commercial lines, for in commenting on the number of messages handled by the operating companies (Postal Telegraph-Commercial Cables) it says: "The volume of business handled by your landline system for the year 1923 was most satisfactory. A general reduction in trans-Atlantic cable rates in April last caused a slight falling off in the revenues of your Atlantic cable system as compared with the previous year. However, a gradual increase in the number of cable messages is now more than offsetting the loss in revenue caused by the reduction in rates, and your cables for the past few months have been daily carrying the largest number of messages ever transmitted over them, exceeding even the number carried during the abnormal war period between 1916 and 1919. This is a very gratifying condition when it is considered that business conditions in Europe are so far from normal. Such a great volume of traffic augurs well for the future of the cables when peace and tranquillity are restored in Europe and normal business relations and trade are again resumed. It must also be reassuring to the shareholders in telegraph and cable companies to know that the competition of the radio, which has existed since the close of the war, is having no effect on the volume of business being transmitted over the cables, but on the contrary radio would appear to be stimulating the use of electrical communication between the continents. The radio has now been in practical operation for a sufficient time to show that there is room for both methods of communication, namely cable and radio, with the former more than holding its own because of its superiority in the fundamental requirements of secrecy and reliability."

The report reviews such achievements as the laying of the new giant cable between New York and France and the concurrent granting by the French Government to the Commercial Cable Company of the right to establish a business office in Paris at 24 Boulevard des Capucines to deal directly with the public in the handling of messages and the further right to connect this office by direct wires with the Atlantic cables, thus allowing of instantaneous communication between New York and Paris.

"This is a concession," says the report, "for which your Cable Company has been contending for years past, the policy of the French Government hitherto being the same as that of other Continental countries, namely, denying the right to privately owned cable and telegraph companies to deal directly with the public. The decision of the French Government to permit the Commercial Cable Company one public office in Paris is particularly gratifying in view of the opening of its new cable to France. Fortunately that company was ready to take immediate advantage of this important concession, as its new office at 24 Boulevard des Capucines, Paris, which was opened in 1922, was equipped in anticipation of its transmission of cablegrams afforded through this office will substantially aid in the productivity of the new cable."

As stated in previous reports, The Commercial Cable Company has a contract with the German Atlantic Cable Company providing for the laying by that company of a cable from Emden, Germany, to the Azores Islands (1,888 miles) and the laying by The Commercial Cable Company of a cable from the Azores Islands to New York (2,302 miles), to connect with such German cable. The laying of the above cables has been delayed because of the protracted negotiations with the Portuguese Government for landing rights at the Azores. Immediately such landing rights are secured it is the intention to promptly commence the manufacture of the cables, so as to restore the direct cable communication which the Americas enjoyed with Germany prior to the war. Cable communication is now had between the Americas and Germany only via England and France.

With regard to the expansion of the Postal Telegraph, the report announces that last Fall construction was started on a new transcontinental route which involves the stringing of new copper wires on present pole lines in the East and on the Pacific Coast, and the erection of a new pole line with copper wires from Dallas, Texas, to Los Angeles, Calif., approximately 1,500 miles. In the construction of this new line there will be used approximately 60,000 telegraph poles, and 3,000,000 pounds of copper wire. This new route is expected to be completed this Spring, thus giving the Postal Telegraph System three distinct transcontinental routes. This new transcontinental route is important and essential for two reasons: first, to give a route across the Continent which will avoid the weather conditions to which the Company's present two transcontinental lines are subject, and, secondly, because of the increasing telegraph business to and from the Pacific Coast.

The Research and Engineering Departments, in consultation with Prof. M. I. Pupin, are making constant study and application of superior and more economical methods of transmission over landlines and cables, with the aim of securing the greatest possible utilization thereof while at the same time reducing the expense of operation. They are giving particular attention to practical developments for increasing the capacity of long submarine cables, both by possible changes of construction and by perfecting methods of duplexing. These two problems are closely related.

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Frank E. Maize Appointed Electrical Chief

AFTER thirty-five years in the city's service, Philadelphia, Pa., Frank E. Maize was promoted as chief of the Electrical Bureau on February 7th, by Director of Public Safety Butler. Mr. Maize, who lives at 4927 North Mervine street, succeeds James F. McLaughlin, who resigned last November because of ill health.

"Mr. Maize, whose record of thirty-five years shows that he has been a faithful and loyal employee, is an ideal man for the position," said Director Butler.

It was due to the work of Mr. Maize while he was holding the position of assistant manager of the electrical bureau, that the ornamental lighting system was installed on the central highways of Philadelphia in 1910. He followed the plans of the late Mayor Reyburn, who first introduced this method of lighting on a small scale in this city.

Mr. Maize was born in Huntingdon, Pa., and at thirteen years of age learned telegraphy. He served with the Western Union Telegraph Company and the Baltimore and Ohio Railroad Company. He was night manager of the latter's telegraph and dispatch system in 1887, when he entered the service of the city as an electrical bureau operator. A year later, he was promoted as inspector of fire alarms and the police patrol system.

From 1894 to 1907 he had charge of the erection and wiring of all trolley poles and the bonding of rails by trolley companies. He was made assistant manager of the bureau in 1910. In this post, he had charge of rebuilding the high-pressure telephone service and placing a registering device in each fire house for the purpose of maintaining a permanent record of all fire alarms.

In 1921 he was promoted to the post of manager of the bureau, where he planned the improvement of the power plant in City Hall and the extension of the underground cable system.

Built First San Diego Telephone Lines

THE days when San Diego had only twelve telephones were recalled on January 22nd, by the man who established the first telephone system in San Diego—J. W. Thompson, eighty-two years old, pioneer of the west and dean of telegraph operators.

Mr. and Mrs. Thompson arrived a few days ago from San Francisco, their present home, for a month's visit with old-time friends and relatives. They are guests of their daughter, Mrs. Emma T. Shellenberger of National City.

Mr. Thompson's white moustache and beard were moved by a smile as he related reminiscences of San Diego's younger days. It's a different city from what it was back in 1882," said he. "That was the year that we started establishing the telephone system. We began with twelve subscribers. I remember that George Marston was one of them and Dr. P. C. Remondino was another.

"At first we looked upon the telephone as something of a joke—a plaything. Every time someone would come over for a visit, we would ask if he didn't want to try the telephone. At that time the instrument had no transmitter, but was made up of two parts shaped like the receiver today. One we would put to the ear and the other one, we would talk through. I had a 10-year contract to operate the system and at the end of that time our subscribers numbered more than 300. Few of us guessed, though, that the telephone would ever amount to what it does to-day."

Mr. Thompson helped string across the continent the first American telegraph. That was in 1861 and the trip from east to west was made in a covered wagon, to the consternations of the Indians who inhabited the plains, he says.

Mr. Thompson, who was born in Michigan, and came to San Diego in 1874. He lived in San Diego until 1909, when he removed to Oakland. Since 1910 he has lived in San Francisco where he now has charge of a ferry station. He is the father of five children, all residents of California. For sixty-three years he has been a telegraph operator and he hopes to continue in that service for many years more.

Haskin's Galvanometer

H. J. PETTENGILL, chairman of the Southwestern Bell Telephone Company, St. Louis, Mo., has sent us for the archives of the Old Time Telegraphers' and Historical Association, a copy of Haskin's Galvanometer, a book that was printed by D. Van Nostrand and Company, New York, in 1873. Mr. Pettengill purchased this book when he was an operator for the Western Union Telegraph Company at 109 State Street, Boston, Mass. We are glad to add this old time book to the Old Timers' collection of old periodicals and we gratefully acknowledge the receipt of the same herewith. Mr. Pettengill was president of the Old Time Telegraphers' and Historical Association for the year 1899 when the reunion was held in Boston, Mass., at which time Mr. Pettengill was superintendent of telegraph of the Postal Telegraph Cable Company in that city.

LIEUT.-COL. NORMAN HARRISON, C.M.G., D.S.O., M.I.E.E., who retired last November from the under-Secretaryship, Department of Posts and Telegraphs of the Union of South Africa, has joined the Directorate of the Western Electric Company, Ltd., and will shortly return to South America to take up residence there in the interests of the company.

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EDITORIAL COMMENT

"Conscience and Success" Well Received

THE little book bearing the above title and recently issued under the authorship of Fernard E. d'Humy, New York, is being heartily received by readers of Telegraph and Telephone Age. The author is so intimately known to the telegraph fraternity that his readers individually feel that they are receiving a direct personal message from him. "Conscience and Success" carries to every true reader a true message of service as announced in its foreword, with the hope "that it may serve as a stepping stone along the path that leads to the highest goal." Two great admonitions are given; the first being to "trust your conscience and you will be led to do what is right"; the second is to "say only what you believe, for success is yours if you believe all you say." Then, are taken up the inherent human rights to health, happiness, prosperity and love, which are at the command of all who obey the law of being. The teachings of Jesus are reviewed with practical applications of the truths spoken to His followers from the beginning of the pretold Messianic period until the end of Christ's ministrations on earth. It is a wholesome, comforting, inspiring little book, presenting spiritual truths in such simple form that even advanced students of divinity will find interest in their interpretation. "Conscience and Success" may be obtained through Telegraph and Telephone Age at $1.00 per copy.

Telegraphers for Signal Corps

THE 101st Signal Battalion, National Guard, New York, was inspected by Lieutenant George L. Townsend, U.S.A., at its Armory, at 34th Street and Park Avenue, New York, on Thursday evening, February 14th.

This Signal Battalion, being composed largely of men identified with the Postal Telegraph Cable Company, the Western Union Telegraph Company, the New York Telephone Company, and the New York Edison Company, it is felt that this item will be of interest to many of the business associates of these men.

There are a few vacancies in the Battalion for men who are technically qualified as operators, linemen, or electricians, and all information regarding enlistment may be had upon application to Lieutenant Theodore F. Endress, Company "A," 101st Signal Battalion, N. Y. N. G.

Seeing By Wireless

SHALL we have Radiovision this year?

Sanger Shepherd, the well-known wireless expert, of London, England, said recently that he hopes to demonstrate it at the Wembley Exhibition.

It was he who made the radiovision apparatus with which M. Belin has been carrying on highly-successful experiments, with the backing of the French Government.

He also planned the transmission and reception of the first photograph to be cabled across the Atlantic, that of the American Cup Yacht Race in 1920, also the Carpentier-Dempsey fight in 1921.

For years he has been going on quietly experimenting; and so have one or two other men. But the trouble is that the erection and demonstration of the whole apparatus would cost more than any of these men can afford.

When asked, a few years ago, to give an estimate for the transmission of a picture over a distance of a few hundred yards, Mr. Shepherd replied that the transmission of a picture measuring five inches by four inches would need an installation costing £100,000, while a picture the size of a postage stamp would need an outlay of £10,000.

That is the trouble. Lack of money has prevented further progress in this direction. But Mr. Shepherd hopes to be able to do something in a small way, this year, at Wembley.

King George and Argentine President

ON January 25th, the President of the Argentine Republic addressed the following message by wireless to His Majesty the King: "On the occasion of the inauguration by me of the Monte Grande high-power radio telegraphic station, I transmit to your Majesty with my respectful greetings the good wishes of the Argentine nation, and the expression of our hope that the friendship uniting our peoples may grow daily more cordial. This improvement in the methods of communication will, I believe, contribute to that end, and will be a new factor in the progress with which the intelligence and energy of the British people are so closely identified. (Signed, Alvear, President of the Argentine nation."

His Majesty caused the following reply to be sent: "To Senor Alvear, by wireless. I cordially reciprocate the sentiments contained in Your Excellency's telegram of January 25th, and welcome the establishment of any means of friendly communication which will strengthen the friendly relationship so happily existing between our two countries.—George R.I."

Western Electric Company

Two contracts totalling about eighty thousand dollars have been let by the Western Electric Company to the Turner Construction Company for materials and installation of materials at the new telephone switchboard and cable works now under construction at Kearny, N. J.

One thirty thousand dollar contract covers the supplying and installing of pivoted type window sash and frames, including glass and glazing, in several units on the company's sixty acre tract. One fifty thousand dollar contract covers the furnishing and installation of miscellaneous iron and steel.

The first buildings of the Kearny Works will be completed and manufacture started this fall. They will be devoted to the manufacture of telephone cable.

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CABLE CIPHER CODES

We have made the subject of cable cipher codes a study for over forty years. There are many hundreds of codes on the market that have been offered to the public at one time or another. We are familiar with the most prominent of them. This publication is headquarters for all cable codes. Many telegraph managers direct their inquiries for information on the subject of codes to the publisher of a particular code, who usually answers that he never heard of the book for which information is sought, but his own code will, no doubt, meet every requirement. As we deal in all codes without favoring any particular one, we are naturally headquarters for the different code books and are, therefore, in possession of information concerning most all of them. Bear these facts in mind when you have inquiries from your customers for codes, and direct your orders to

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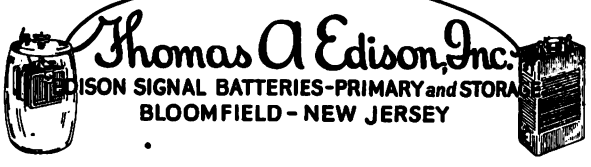
TELEGRAPH AND TELEPHONE

LOW MAINTENANCE COST

As the cost of inspection and maintenance is made up chiefly of inspectors' or linemen's ex- high capacity, capable of taking care of all high capacity, capable of taking care of all functions at a station for a period of two years or more without attention or renewal, brings maintenance figures way down. And Edison Primary Batteries bring them lowest.



ST. LOUIS Railway Exchange Bldg. CHICAGO Peoples Gas Bldg. SAN FRANCISCO Balboa Bldg. 2002-36

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

A MEETING of Committee No. 6—Message Traffic will be held at the Hotel Statler, St. Louis, Mo., on Wednesday and Thursday, March 12th and 13th. The first day's session will convene at 10:00 A. M.

A MEETING of Committee No. 10—Education and Training of Telegraph and Telephone Employees, will be held at the Hotel Statler, St. Louis, Mo., March 14th. The meeting will convene at 10:00 A. M.

A MEETING of committee No. 11—Telegraph and Telephone Transmission—will be held at 30 Vesey Street, New York City, on Wednesday and Thursday, March 19th and 20th. The first day's session will convene at 10:00 A. M.

A Deserved Promotion

J. A. JONES, superintendent of the Southern Railway System, with headquarters at Charlotte, N. C., was on February 1st advanced to the position of general superintendent of telegraph by Vice-President H. W. Miller, with headquarters at Washington, D. C.

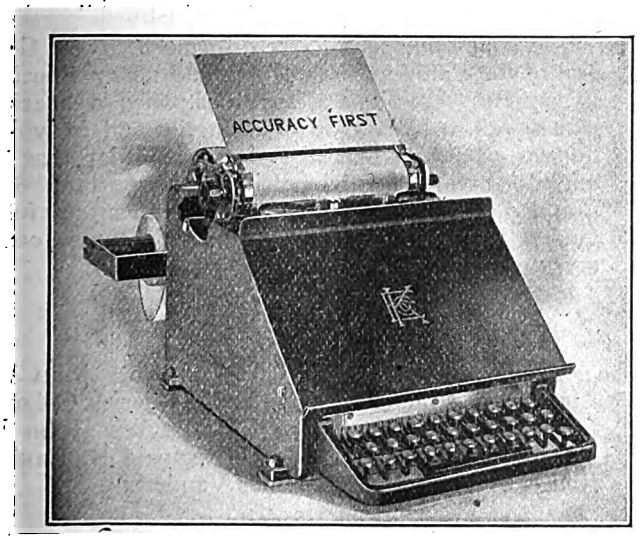
Previous to 1909, Mr. Jones was in the service of the Southern Railway Company for a number of years as wire chief and manager of one of its large relay offices located in the south, which was one of their main repeater and multiplex points. From 1909 until 1916 Mr. Jones served in the capacity of chief clerk and assistant superintendent of telegraph with headquarters at Washington. On December 1st, 1916, he was promoted to be superintendent of telegraph of the system. In January, 1917, the headquarters of superintendent of telegraph, along with several other of the operating officials, was transferred from Washington to Charlotte, N. C. On February 1st, Mr. Jones was made general superintendent of telegraph and a staff officer of Operating Vice-President Miller with headquarters at Washington, D. C.

Unemployed Wireless Operators

THE following appears in the columns of the Wireless World and Radio Review of London:

At the present time 1,800 persons holding the P.M.G.'s First Class Certificate in Wireless Telegraphy are unemployed. In view of this fact it behooves would-be-candidates parents and guardians, to examine very carefully the prospectuses of the various wireless colleges, and to ascertain for themselves what prospects are offered to students when their training is completed.

This timely caution is issued by the Association of Wireless and Cable Telegraphers of Lennox House, Norfolk Street, Strand, W.C.2., London, England, from whom up-to-date information concerning all aspects of the marine wireless profession can be obtained.



"SAY IT TO THE OTHER END IN WRITING."

Four Telegraph Typewriters enable one Railroad to move freight cars twenty-four hours earlier than before the installation was made.

These typewriters are in series on a way wire connecting freight yards, piers and general offices. Motor generators are eliminated by equipping the alternating current points with A. C. motors. All relays are eliminated and although the typewriters are connected electrically like main line sounders, no adjusting is necessary during wet weather conditions.

The machines are used continuously. During the day the messages and waybills are taken from the machines as they are received. At night the receiving clerks go home but the machines stay "on the job to take the message." All night long they receive without human aid.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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Dinner in Honor of John L. Merrill

In honor of John L. Merrill's fortieth anniversary with All America Cables, Incorporated, seventy guests attended a dinner at the Metropolitan Club on February 14th. W. Emlen Roosevelt acted as toast-master and a short talk on Mr. Merrill's progress in bringing about a better understanding between the "Three Americas" was given by R. Fulton Cutting. Edmund L. Baylies outlined, in detail, Mr. Merrill's progress from office boy in 1884 to his ascendency to the presidency in 1917. Doctor R. S. Rowe, Director of the Pan American Union at Washington, said among other things:

"I deem it a very real privilege to be permitted to participate in this tribute to the eminent service of Mr. Merrill, not only to the All America Cables, but, also, to the cause of international relations on the American Continent. I doubt whether the people of this country realize to what an extent our international relations are dependent on the means of communication. Closer understanding between the nations of the American Continent has been delayed by reason of the inadequate transmission of the facts of national life from one country to another.

"There is a tendency on the part of the American people to delegate to the Government all questions affecting international relations. As a matter of fact, the field of action of the government in its organized capacity is exceedingly limited in bringing about closer relations between the nations of this Continent. These relations depend to a far larger extent on closer ties between the peoples rather than between the governments, and closer relationship is in turn dependent upon the dissemination of information which will give to the people of Latin America thorough knowledge of the point of view, thought and ideals of the people of the United States and to the people of this country a better acquaintance with the culture and civilization of the Latin American nations.

"In the fulfilment of these great purposes Mr. Merrill has played a conspicuous part. Quietly and unostentatiously, he has labored to spread more adequate and more accurate information of national purposes and national ideals among the nations of America. For this accomplishment we, as citizens, owe him a debt of gratitude. His work has served to further the purposes for which the Pan American Union was established. Both as a citizen of the United States and as Director General of the Pan American Union I desire to express a deep sense of obligation and to join most enthusiastically in this tribute."

Senator Medill McCormick, who has long been connected with the Latin American division in Congress, stated: "I wish to heartily join in this celebration of an anniversary which at the same time fittingly celebrates our successful efforts to free the American merchant, the American banker, the American ship-owner, the American newspaper, and, indeed, the whole American Republic from the monopoly or domination of foreign owned cables on the Western Hemisphere. With a renewed vigor let us now complete, in the Caribbean Sea, the work of an All American Communication System so auspiciously and so successfully carried through in South America by All America Cables and by you, Mr. Merrill."

The Honorable John Bassett Moore, distinguished lawyer and international diplomat forwarded, via telegram the following: "My dear Mr. Roosevelt: It is with great regret that I find myself prevented by a previous engagement from being present at the dinner to be given at the Metropolitan Club on February 14th, to celebrate the fortieth anniversary of Mr. Merrill's connection with All America Cables, Inc. For the reason that I feel really disappointed because of my inability to accept your courteous invitation, I venture to write this note instead of sending a formal reply.

"My first recollections of the great organization of which Mr. Merrill is now the head naturally are associated with the name of the Central and South American Telegraph Company and with James A. Scrymser, its founder and former president, with whom I often came into contact. Among the books I highly prize is the copy of his Reminiscences which he kindly sent to me. His courage and fidelity, his restless energy and rare sagacity, are attested by the results which he achieved; and when those in charge of the vast interests, which he did so much to create and build up, intelligently chose as his successor your guest of honor, as one possessing the same qualities, they paid to Mr. Merrill a tribute of which any man well might be proud. The present occasion is but a graceful token of the ample measure in which this tribute has been justified."

The Honorable John Barrett, former Director General of the Pan American Union and now a Specialist on Pan American affairs, postponed a hearing which was to be held in Washington and in which he was to act as Special Arbiter, in order that he might be present for this particularly important occasion and do honor to the man who has so successfully guided the destinies of America's foremost communication system.

The following were present:

Directors

W. Emlen Roosevelt, Percy R. Pyne, John W. Auchincloss, Daniel P. Kingsford, Frederick Osborn, R. Fulton Cutting, Edmund L. Baylies, John L. Merrill, J. Montgomery Hare, Reginald B. Lanier, Robert W. de Forest, Cornelius Vanderbilt.

Officers

J. K. Roosevelt, Chauncey R. McPherson, G. Lincoln Jost, W. A. Eagan, Richard Tyers, Percy R. Pyne, Jr., Clarence Rapkin (retired), Frank K. Warren, Charles Howland Russell, Henry de la Montagne, F. A. Pirie, Frank W. Phelan, H. C. Buchanan, James R. Beard (retired).

There were present, among others, many of the most prominent New York business men such as:

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Marshaling the Telephone Forces

In the simple act of lifting the telephone receiver from its hook every subscriber becomes the marshal of an army. At his service, as he needs them, a quarter of a million men and women are organized in the Bell System. One skilled corps of the telephone army moves to place him in talking connection with his neighbor in the next block, in the next state or across the continent. Another highly trained corps is on duty to keep the wires in condition to vibrate with his words. Still others are developing better apparatus and methods, manufacturing and adding new equipment, and installing new telephones to increase the subscriber's realm of command.

The terrain of the telephone army is the whole United States, dotted with 14,000,000 instruments, all within range of the subscriber's telephone voice. Even in the remote places this army provides equipment and supplies. Its methods of operation are constantly being improved, that each user may talk to his friends with increased efficiency. Millions of money are spent in its permanent works. Yet its costs of operation are studiously held to the minimum, that the subscriber may continue to receive the cheapest as well as the best telephone service in the world.

The permanent objective of the Bell System army is to meet the telephone needs of the nation—a hopeless task were not its command unified, its equipment adequately maintained and its personnel trained in the latest developments of telephone art.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

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Sosthenes Behn, Dr. Augusto Cochrane de Alencar, Frank B. Jewett, H. B. Thayer, Prof. M. I. Pupin, John G. G. Walker, Willis H. Booth, Walter T. Rosen, F. K. Sturgis, Elihu Root, Jr., Adolph Ochs, Herbert S. Houston, Karl A. Bickel, James Speyer, William E. Peck, Ernest Hopkinson, Joseph P. Grace, J. Gegou, Edwin G. Merrill, George W. Davidson, General J. G. Harbord, J. MacMillan, Dr. L. S. Rowe, A. Stuart Durant, S. Mallet-Prevost, Charles G. DuBois, General John J. Carty, James Brown, Rev. John F. Patterson, D.D., J. Goldhammer, John Henry Hammond, William Pierson Merrill, Elisha Walker, Julius Lay, William J. Deegan, Edward Dean Adams, Senator Copeland, Newcomb Carlton, John L. Merrill, Jr.

Improvident Operators

By R. W. Ledwith

A young man of to-day said to the writer: "Most of the old-timers were improvident." A majority were, perhaps. Even that is an open question. He says it is not so to-day. The latter is a subject for mutual congratulation if true.

The subject matter is interesting. Why were the old-timers improvident? The chief recruiting station in the old days was the messenger service. That is largely true to-day. The average messenger boy, past and present, is the product of environments not calculated to inculcate habits of business nor thrift. While that is true it is not submitted as a criticism or reflection. The vociferous, ragged, care-free newsboy may, in fact has, often developed into the great editor; the telegraph messenger into the brilliant star in the stellar constellation of practical telegraphers.

But the comparison of the newsboy and the messenger-boy ends with the nursery. The pathway of the newsboy is along lines of constant enlargement; that of the messenger has been and probably is to-day in a measure restricted. The former has had and has to-day the wide open field of human activity before him; the latter is confined to one territory of limited accomplishment and reward.

Regretfully the old managements of the operating forces fostered improvidence individually and collectively. The harsh, rigid and in most instances unnecessary rules and regulations gave birth and encouragement to resentments. In a large part it created the "floater," that gentle flower of the road who at times and under varying circumstances became more than improvident. The writer is informed this condition is not so general to-day. That is desirable and encouraging to all concerned.

The average telegrapher in the early days, and perhaps to-day, was rated as deficient in the primary requirements of business management and that means *thrift*. In this one's equipment revolved around one's observations of business mechanically handled in receiving and sending telegrams. But if thoughtfully observing and of retentive memory this was certainly an invaluable schooling. A minority improved the opportunity, the majority, perhaps, did not. The same is more than likely true to-day, is it not?

The telegraph in itself encourages improvidence! It is a fascinating factor in one's early experiences—the exchange of business with a distant point; the wire talks; the friction and humor creates and encourages the desire to see the fellow at the other end, coupled with the hope of improving individual conditions. It is one of the irresistible human impulses to see and know the first "unknown correspondent." Is it not?

But in a larger and unavoidable sense improvidence is personal—the result of the ills that flesh is heir to. The home fires may be extinguished by death; affliction may paralyze ambition and effort; may create utter disregard of place and time; may disturb and destroy mentality and create a morbid longing for "30"—the end.

Except with the good motive of assisting to alleviate conditions, bind up the wounds and lessen the thrusts of misfortune the cloak of fraternal charity should shield the wayward, old or young, from unjust comparisons and unmerited criticism." "Render unto Cæsar the things that are Cæsar's."

South American Cables

According to *The Times*, London, an agreement has been reached between the German Cable Company and the Eastern Telegraph Company by which the latter's system will carry German overseas traffic to South America pending the completion of the new German cable connection between Emden and Vigo. For this purpose the Borkum cable, belonging to the German company, has been lengthened *via* Dumpton Gap to London in the one direction and to Emden in the other. The London end is to be linked up direct to the Eastern Company's system. The agreement is for a period of about three years, and has been made in order to renew certain parts of the cable which were left derelict when the German cables were appropriated by Great Britain and France in the early days of the war. The negotiations have been in progress over a year.

The Eastern Telegraph Company has laid ten miles of cable to connect at Dumpton Gap with the land line which it rents from the British Post Office and which is used in connection with a Belgian cable. Through that line German traffic will therefore be put direct on to the systems of the Eastern and Western Telegraph Companies.

Greenland Radio Station

It is proposed to construct a radio station in Greenland, and the Danish Ministry of Finance and the Ministry for Home Affairs are considering the estimates at the present time. Two offers are said to have been received from a Danish firm and a German company (Telefunken) respectively for the establishment of the station. It is computed that the station will involve an expenditure of 800,000 kronen, and it will be able to communicate with Thorshavn.

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PERSONAL

DR. WILLIS RODNEY WHITNEY, director of the Research Laboratory of the General Electric Company, Schenectady, N. Y., recently presented a scientific lecture before the American Association for the Advancement of Science, Cincinnati, Ohio, in the Hughes High School auditorium. Dr. Whitney spoke on the "Vacuum, There is Something in It," and his address was illustrated by striking experimental demonstrations of the latest developments in vacuum tubes.

POSTAL TELEGRAPH-CABLE CO.

WILLIAM C. DAVIET, vice-president, has returned from a short business trip to Rochester, N. Y.

Curtis A. Comstock, vice-president, is back at his desk after several weeks illness.

Rufus Gould, plant supervisor, is still supervising the construction of the new line between Fort Worth, Texas, and Los Angeles, Calif.

F. W. Phillips, superintendent of plant, is supervising repairs to lines in the Sixth District, Eastern Division.

Commercial Pacific Cable Co.

SUPERVISOR A. MCDERMID, recently transferred from San Francisco to Manila, arrived at that place on February 21st.

Operator A. J. Cottrell left Honolulu on holidays on February 20th.

Supervisor W. S. Fraser, who met with an automobile accident in San Francisco, is progressing favorably.

Superintendent E. Desnouee, who is in France on sick leave, continues to show improvement in health.

Radio Corporation of America

MAJOR GENERAL J. G. HARBORD, President, made the following statement on February 26th:

"The Radio Corporation will this year pay the 7% dividend on its Preferred stock, which is cumulative from the first of January, 1924.

"It is anticipated that at the meeting of the stockholders to be held in May, the Charter of the Corporation will be amended so as to reduce the number of shares of authorized preferred stock from 5,000,000 to 500,000 and the authorized no par value common stock from 7,500,000 to 1,500,000 shares. The plan is to retain the capitalization of the Corporation as at present authorized, but to create a par value of $50, for the preferred stock, to be known as "A" preferred stock, for which the present preferred stock will be exchangeable at ten shares of the present for one share of the new stock and to exchange the present common stock at the ratio of five shares of the present stock for one share of the new or "A" common stock.

"The exchange in cases where the present stock is not held in multiples of ten and five shares will be facilitated by the issuance of fractional shares of the new stock.

"The "A" preferred stock will be entitled to receive 7% dividends, payable quarterly, cumulative from January 1, 1924, the payment for the first two quarters of 1924 to be made in July. Shares of the present preferred stock not converted into the new, and fractional shares resulting from uneven multiples, will receive the 7% dividend, payable, as may be determined by the Board of Directors, but cumulative from January 1, 1924. Stockholders who have not exchanged their preferred stock in time for a particular dividend date on the "A" preferred stock, will be entitled to any accrued and declared dividends on said "A" preferred stock after they make such conversion.

"The dividend rights of the preferred stock over the common stock, and the voting rights of each, will be preserved in this arrangement.

"After this change is effected, application will be made to list the "A" preferred and the "A" common stock on the New York Stock Exchange."

DAVID SARNOFF, vice-president and general manager, addressed the Princeton Club on February 26th. Mr. Sarnoff's talk was illustrated by a motion picture film entitled "The Mystery Box." He spoke on the three branches of Radio, namely: Marine, Trans-Oceanic, Broadcasting.

Pierre Boucheron, manager of the advertising and publicity department, will deliver an illustrated lecture on Radio before the Forest Hills Masonic Lodge, on March 4th.

E. J. Nally, managing director of International Relations, is expected to arrive in New York from Paris on March 1st, on the steamship America.

J. L. Bernard, in charge of the information bureau, will deliver a lecture on March 1st before the New York Engineers' Protective Society entitled "High Life on Modern Radio." He will use lantern slides.

Chile German Radio Station

APPLICATION has been made to the Chilean Government by the Siemens Schuckert Company of Germany, to install a system of radio stations in the Chilean Republic. The proposed stations would be of the Telefunken type and would cost $1,385,000 (gold) (1 gold dollar=18d.). The offer comprises the completion of 11 stations in the course of 15 months, to be located as follows:—5-kW stations at Iquique, Antofagasta, Valparaiso, Santiago, and Punta Arenas: 2-kW stations at Calderá and Valdivia; and 4¼-kW stations at Tocopilla, Taltál, Coquimbo, and Ancud. There is every probability that the offer will be accepted, an intimation to this effect having already been made by the Minister of the Interior. At present all radio stations in the Republic are of the Marconi type, operated and controlled by the Chilean Naval Department. Public disapproval has already been expressed of the change-over from the British to the German type, but in view of the fact that the Chilean Ministry is so frequently changed before projected plans can be carried into effect, it is not improbable that the concession asked for by the Siemens-Schuckert Co. may be deferred, or, if granted, subsequently cancelled.

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WESTERN UNION TELEGRAPH CO.

H. G. HEININGER, division superintendent, Southern Division, Atlanta, Ga., was a recent New York City business visitor.

J. J. Welch, vice-president in charge of traffic, left on February 23rd on a trip through the south and central west.

THE Western Union Messengers' Band of New York City will broadcast from the Radio Corporation of America's station WJZ (wave length 455 metres) on Saturday evening, March 15th, from 7:30 to 8:30 P. M.

This will be their second radio concert. An exceptional program is being arranged and we can assure all who listen in of a real treat. The band consists of forty pieces.

RECENT heavy buying in Western Union Telegraph stock has been done largely by people who are impressed with the favorable earnings position of the company and the current reports of operations. Western Union's net income applicable to the capital stock, of which there is close to $100,000,000 outstanding, has been running at the rate of approximately $13 a share against the $7 annual dividend disbursement. At the end of 1923 the profit and loss surplus was around $50,000,000.

Clever Delivery Service

THE following examples show the resourcefulness of the messenger boys when they are sent out with a message with an obscure address. It is a matter of fact that the messenger boy will deliver the message to the proper party if he is to be found within a safe distance of the office. A safe distance means many miles and the record of deliveries is a long and honorable one. J. C. Willever, vice-president in charge of Commercial, New York, is much pleased with the performance of messenger boys in the delivery of messages:

Recent reports include the following:

Globe Golding Bros. Co., delivered to Globe Folding Box Co.; Myer Y. Corpn., delivered to Myer Y. Cooper; Jacobs & Ronda, delivered to Jacob Douda; I. Fellerson, delivered to Isaac Faller Sons; Andrew Gorgem Co., delivered to Andrew Jergens Co.; Lalzer Wolf, delivered to Salzer & Wolf Co.; Decker & Co., delivered to Drucker Co.; Frank Bros., delivered to Funck Bros.; W. R. Blockman Co., delivered to Weil Brockman Co.; S. Foresberg, delivered to S. Freiberg.

Union Press Co., delivered to Union Trust Co.; Shomer Co., delivered to Shirmer Co.; J. P. Moore Co., delivered to J. B. Moos Co.; 1708 Hayne Ave., delivered to 1708 Payne Ave.; E. J. Meddgar, delivered to E. J. Metzger; Truss Mfg. Co., delivered to Russ Mfg. Co.; Tyle and Olive Co., delivered to Pyle & Allen Co.; Natl. School and Talk Co., delivered to Natl. Screw & Tack Co.; T. S. P. Brittain Co., B. T. & S. P. Day Co.

Milk Produce Co., delivered to Milk Products Co.; Bler Mfg. Co., delivered to Grabler Mfg. Co.; Cleveland Mining Co., delivered to Cleveland Tanning Co.; 905 Fetland Bldg., delivered to 905 Swetland Bldg.; 8701 Coniagie Ave., delivered to 8701 Carnegie Ave.; 3543 Drango Ave., delivered to 3543 Orange Ave.; 648 Boulivard Rd., delivered to 648 Bolivar Road; 1419 Country Ave., Lakewood, delivered to 1419 Countant Ave.; 5301 Sorin Ave., delivered to 5401 Lorain Ave.; Biedman Co., delivered to Weidman Co.; 18801 Slaine Ave., delivered to 18801 Sloane Ave.; 11213 Ackerbury Rd., delivered to 11213 Ashbury Rd.

No. 11319 Tuscom Ave., delivered to 11319 Tuscora Ave.; 1299 Bellaire Ave., delivered to 1299 Bell Ave.; J. L. Faupaugh, delivered to J. L. Forepaugh; Moriarity Iron & Steel Co., delivered to Variety Iron & Steel Co.; Myers Earl Co., delivered to Myers Weil & Co.; Flower Fdw. Co., delivered to Bowler Foundry; H. C. Gowner Co., delivered to H. C. Gawne Co.; Coniery & Johnson Co., delivered to Comey & Johnson Co.

Rose Coal & Coke Co., delivered to Rose Robbins Co.; Cleveland Trust Co., delivered to Cleveland Press; H. C. Gowner, delivered to H. C. Gawne Co.; 9164 East 65th St., delivered to 1964 East 65th St.; 4803 Clair Ave., delivered to 4803 St. Clair Ave.; J. M. Brown, delivered to Jim Brown, Prest. Brown Fence & Wire Co.; 444 Cleveland, delivered to 444 Cleveland Rd.; 20000 St. Clair Ave., delivered to 2000 St. Clair Ave.; Cleveland Trunk Co., delivered to Cleveland Trust Co.

Robert D. E. Rowe Dies in Newport, Ky.

ROBERT D. E. ROWE, Civil War military telegrapher, died on February 11th at the home of his son, Walter A. Rowe, as the result of a paralytic stroke suffered four years ago.

Mr. Rowe was employed by the Western Union Telegraph Company before, during and after the war and was manager of stations at Wheeling, W. Va., Oil City, Pa., and Pittsburgh. In the Pittsburgh office he worked with Thomas A. Edison, and became acquainted with Andrew Carnegie, then a messenger boy. He kept up a correspondence with both men. He left Pittsburgh twenty-six years ago.

Mr. Rowe was born in Harper's Ferry, W. Va., and witnessed the capture of John Brown there. When still a boy his family moved to Pittsburgh, where he worked in the Western Union Telegraph office until the outbreak of the war, when he enlisted in the Signal Corps of the United States Army. He retired in 1904 and moved to Newport, Ky., from Pittsburgh.

He is survived by his wife and two sons.

J. J. LYNCH, superintendent of plant, Postal Telegraph-Cable Company, San Francisco, Calif., under date of February 13th writes: "I am glad to enclose herewith my check for $2.00 to pay for my subscription for the year 1924, and to say that it is perfectly all right to renew my subscription."

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From Radio Music Fund Committee

WIDESPREAD approval of the Radio Music Fund to provide prominent artists for broadcast listeners has come in response to the announcement of the committee consisting of Clarence H. Mackay, Felix M. Warburg, Frederic A. Juilliard, and A. D. Wilt, Jr. Contributions received by Central Union Trust Company, 80 Broadway, New York City, the depository of the Fund, have come from persons in all stations in life, and, as had been anticipated, chiefly in sums from $1 to $10. Willingness to continue support of the fund was expressed in many letters.

Members of the committee, officials of Station WEAF, which is to broadcast the programs, and the office of Concert Management Arthur Judson, who is to engage the artists, have received many calls for information ever since the first announcement of the fund. While the committee is very well pleased with the widespread interest shown in the plan by the public, and while letters received indicate that the radio audience is enthusiastically in favor of it, it is of course still too early to judge whether the response will be sufficient to warrant the committee going ahead with the plan.

If the response of the public continues, the committee hopes to be able to announce the date of the first concert in the near future.

The committee again calls attention to the fact that Station WEAF has placed its facilities at the disposal of the Radio Music Fund Committee for the broadcasting of these concerts free of charge. Because of Mr. Judson's wide experience as manager of eminent artists and of the Philharmonic, Philadelphia and Cincinnati orchestras, the firm of Concert Management Arthur Judson has been selected to arrange for the engagement of artists for the concerts.

The most enthusiastic of the many letters received are naturally from those broadcast listeners who, by reason of physical handicaps or lack of opportunity, have never had the privilege of hearing the world's greatest artists, few of whom have been heard over the radio. An extract from a typical letter, received recently. follows:

> "Being a semi-invalid and confined to the house most of the time, I derive a great deal of pleasure and joy out of my radio. God bless the radio, is what I say over and over again. The wonderful lectures and beautiful music, we hear, help us to forget our physical ailments, and see a bright lining in many clouds which otherwise would cast a gloom over us. If by contributing our little mite we can obtain better music, I feel we all should be willing to do so. Please accept this check of mine. Although not large (like many no doubt you will receive) it shows my appreciation of all you are trying to do, and with it goes my best wishes for a grand success. "WEAF" is by far the best station, and you were wise to choose it for broadcasting your programmes. If they do not lessen the power they are now using, everybody I think will be able to enjoy the music, etc., from these."

Mastering Phillips' Code

A RECENT purchaser of a copy of Phillips' Code has this observation to make:

Perhaps your readers will be interested in learning how I mastered the Phillips' Code, or enough of it to give me a fine working knowledge thus enabling me to get by with few breaks.

I first studied the code from beginning to end and then decided to learn the following words first:

All of those words coded by single letters and by two letters and in addition:

Asa—As soon as, Aut—Adjourned until to-morrow, Awx—(not coded, suggested for "As well as"), Cic—Commander in chief, Ckx—Committed suicide, Coc—Chamber of Comerce, Coj—County jail, Cop—Chief of police, Cow—Committee of the whole, Dbf—Destroyed by fire, Ehb—Either be, Ehd—Either in the, Ehf—Either of the, Ehg—Either from the, Eho—Either of, Ehq—Either on the, Ehr—Either are, Eht—Either the, Ehu—Either you, Ehv—Either of which, Ehw—Either with, Ehx—Either in which, Ehy—Either year, Ehz—Either from which.

Fap—Filed a petition, Fapib—Filed a petition in bankruptcy, Fbo—Fire broke out, Ffj—Fugitive from justice, Foj—Fourth of July, Fou—Fourteen (learn CORRECTLY codes for all figure codes and names of days of week), Ftb—For the bill, Ftm—For the murder, Ftp—For the purpose, Goh—Guest of honor, Gom—Gulf of Mexico, Hgb—Having been, Hnb—Has not been, Hvnb—Have not been, Iab—Introduced a bill, Iar—Introduced a resolution, Iat—In addition to, Iaw—In accordance with, Ibo—In behalf of, Icc—Interstate Commerce Commission, Icw—In connection with, Iqo—In consequence of, Isw—In sympathy with, Itc—In this connection, Iwb—It was believed, Iwc—It was claimed, Iwf—It was feared, Iwh—It was held, Iwj—It was alleged, Iwn—It was not, Iwr—It was reported, Iwu—It was understood, Iwx—It was expected, Ixb—It is believed, Ixc—It is claimed, Ixf—It is feared. Ixh—It is held, Ixj—It is alleged, Ixn—It is not, Ixp—It is possible, Ixr—It is reported, Ixs—It is said, Ixt—It is the, Ixu—It is understood, Ixx—It is expected, Jop—Justice of the Peace, Nwg—Notwithstanding.

Oac—On account of, Ogt—On the ground that, Pep—Presented a petition, Poxw—(Not coded, suggested for "Policewoman"), Saf—Spoke as follows, Saik—Shot and instantly killed, Sak—Shot and killed, Sap—Soon as possible, Txb—This is believed, Txm—This is more, Txn—This is not, Txs—This is said, Txt—This is the, Wav—With a view, Wbh—Will be held, Whu—White House, Yaf—Yesterday forenoon, Yam—Yesterday morning, Yap—Yesterday afternoon, and Yav—Yesterday evening.

I have picked up some other words, a few at a time, from this excellent code book and intend to learn the codes for names of different countries and large cities next. I believe that by mastering the above and learning the remainder of the code a few words at a time the code student will be surprised at the ease and quickness with which Phillips' Code can

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be thoroughly learned. After learning the above suggested words I believe it best to start in on the big words as they are the words on which real time is saved in press work and the words the operator will likely have sent to him in starting press work.

Western Electric Out to Enlarge Facilities

To meet the increased demand this year for telephone apparatus, the Western Electric Co. has launched upon another expansion program. Plans are under way already to increase the output facilities at the Chicago factory.

In New Jersey the construction of the $20,000,000 telephone switchboard and cable plant at Kearney, where 30,000 persons ultimately will be employed, is progressing rapidly. The Waverly shops in Newark are in operation and the westside shops in Jersey City shortly will be.

Schedules for 1924 call for the production of 1,200,000 desk stand type telephones or about 480 for every hour throughout the year. The output plans also specify 685,000 message registers in 1924 against 384,000 in 1923; 4,750,000 switchboard lamps in 1924 against 3,199,000 last year, and 225,000 loading coils against 147,000 in 1923.

In addition to the rearrangement necessary to meet this increase, it is expected the manufacturing personnel at Chicago will go well over the 40,000 mark by the end of the year.

Mary and Doug Capitulate on Broadcasting

THE greatest broadcasting event of the year will occur in the near future, for Mary Pickford and Douglas Fairbanks, the two most popular screen stars in the world, have capitulated to public demand and have agreed to make their long-awaited radio debut from station W J Z of the Radio Corporation of America on Wednesday evening, March 12th at 8:15 o'clock.

Heretofore the American public has known both Mary and Doug visually only, for in spite of the requests of movie and radio fans neither Mr. nor Mrs. Fairbanks have felt free from "radio fright" and have steadfastly avoided the microphone. At the luncheon tendered Thomas A. Edison at the Ritz-Carlton recently Mary and Doug found W J Z's microphones before them on the speakers' table and had an excellent opportunity to see first-hand just how simple an operation broadcasting really is.

Consequently the multitude of their visual friends throughout the country will be able to meet them via voice for the first time on March 12th, for Mary and Doug will drop in to the W J Z studio at Broadcast Central, West 42nd Street, New York City, for an informal chat with the radio audience.

Cable Codes

There are a large number of cable codes on the market available for use by business people.

This publication is headquarters for all cable codes. We possess information on most all of them and are prepared to impart this information to those desiring the same. Telegraph people should bear these facts in mind when information regarding codes is desired by customers. Pass the inquiries on to us and they will receive our immediate attention.

The following is a list, together with prices, of a few of the principal codes, which we are prepared to furnish on request:

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Postal Code	10.00
Postal Code, Pocket size	7.50
Scott's Code, 10th Edition, with Bentley Supplement	27.50
Scott's Bentley Supplement	7.50
Universal Trade Code	25.00
Western Union Code, 5 Letter Edition	30.00
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Prices quoted are F. O. B. New York and subject to change without notice. Prices on other codes not mentioned will be furnished on request.

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"Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," by Willis H. Jones, offers the most complete study of the telegraph ever published. This standard text-book has been revised and brought up to date, and in addition to numerous diagrams and complete information covering the study of the telegraph, includes full descriptions of the newest apparatus adopted by the Western Union and Postal Telegraph companies, and describes the equipment of a modern telegraph office. This valuable book, with its 488 pages, 250 illustrations, and carrying an appendix of 24 pages and 16 illustrations covering the new Western Union Multiplex System, is the most sought after electrical book on the market. $2.50 per copy. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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CONTENTS

PAGE

Approaching the Ultimate in Radio with the Super-Heterodyne. By E. E. Bucher 124
North Sea Cables 126
Interference from Radio Receivers. By L. W. Chubb 127
Printed Proceedings of the Telephone Pioneers of America 128
Sholes Typewriter. By S. L. Robinson, Petoskey, Mich. Telegraph and Telephone Life Insurance Association. West Indies New British Cable 129
Assassination of Garfield. By R. W. Ledwith. Electrical Aid Society of Philadelphia 130
A California Trip. Associated Press Sets New Moving Record 131
By the Sweat of His Brow. Possible West Indies Cable Sale 132
Canadian National Telegraphs 133
Statement by Godfrey Isaacs 134
Ben W. Colley. Radio Corporation of America Athletic Club 135
Editorial Comment. Speeding up the Telegraphs. Wireless Relaying Avoided. First Cable Steamer Built in Holland. Appreciated Testimonial. West Indian Cables 136
Railroad-Telegraph and Telephone Section of the American Railway Association. Radio Corporation of America 139
Listening-in on an Express Train in England. All America Cables 140
Personal. Postal Telegraph-Cable Company. Commercial Cable Company. Another New Cable Ship 142
Western Union Telegraph Company 143
Crippled Wireless Stations to Reopen 144
Utah Boys and Girls Who Talked by Lightning a Generation Ago. The Pinot Morse Printer 145
Telegraph and Telephone Life Insurance Association. Telephoning to Liners. Electrification of English Railroads 146

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Approaching the Ultimate in Radio with the Super-Heterodyne Receiver

By E. E. Bucher

The greatly increased public interest in that remarkable receiver, the super-heterodyne, coupled with the appearance on the market of a highly developed commercial form of this instrument warrant a general description of what it is and what it can do. The ordinary, older super-heterodyne receiver, as built experimentally by a few advanced radio enthusiasts in the past, used from eight to ten tubes, was difficult to operate, radiated energy continuously, and did not have many of the other characteristics of a satisfactory set for use in the broadcast reception field. Recently, however, the Radio Corporation of America has placed on the market two Radiolas, namely; Radiola Super-Heterodyne and Radiola Super-VIII, which use the same new circuit in different box and cabinet arrangements. These new receivers are so radically different from the older plain super-heterodyne receivers that they really should have a new short name, but none has been invented as yet.

All super-heterodyne receivers are members of the well-known heterodyne receiver group, and these have long been used to receive so-called continuous wave radio telegraph and radio telephone signals. It is a complicated class of receivers which require expert radio knowledge for their construction, but they may be used by anyone when properly built. The new RCA Super-Heterodyne receiver is known in full by the technical designation of a "second harmonic regenoflex super-heterodyne receiver."

The term "super-heterodyne" means that this new set does not depend alone on radio frequency amplification, nor yet on audio frequency amplification alone, nor on regeneration, nor even on a combination of these powerful methods of increasing the signal strength. More was required in the way of stable and selective amplification than these two previously used methods of amplification could alone yield. It became necessary to have a third and new frequency at which to amplify, namely; the so-called "intermediate frequency," which is considerably higher than the audio frequency and much lower than the radio frequency. The combined use of these three frequencies gives an over-all amplification of an amazing magnitude which makes the set so sensitive that it reaches further on a small loop than the existing sets do on a large antenna.

And now we will permit the sceptical radio broadcast listener to step forward and make a series of demands for his ideal receiver, laying down the most difficult specifications which he can; and then we can investigate how the second harmonic regenoflex super-heterodyne Radiola meets these requiremnts. Each demand will be followed by its corresponding answer.

Demand 1: "To install my new receiver, I want only to carry it into the house and stand it on the table or floor. I do not want to put up any aerial wires or ground wires or any wires at all. In fact, installing my ideal receiver should be like taking a phonograph into the house and playing the first record immediately."

Answer 1: Naturally a receiver which is so sensitive that it can hear across the continent on its own self-contained loop under good conditions needs no antenna or ground, and installing in the home means placing it where you think it looks best and leaving it there.

Demand 2: "To receive my first concert, I want to turn a knob or two so that an index dial points to the name of the station I desire, and then press a button and hear the music."

Answer 2: Since there is no variable antenna to take account of, but only a permanent and constant self-contained loop, it is possible to mark on dials provided for this purpose the setting corresponding to the stations desired for every listener no matter where he is located; and after this is done, getting a station means merely setting the two "Station Selector" pointers to the desired station, pulling out a button, and listening. If desired, the music can be made louder or softer by an additional control which influences nothing else (neither the tuning settings nor the quantity).

Demand 3: "If I am near a powerful broadcasting station, I do not want to hear it or even know it exists when I want to hear a distant station instead. I want this ability to listen to a station or not entirely at my own choice. The receiver I want should therefore have perfect selectivity."

Answer 3: The loop circuit of these receivers, is a tuned circuit at radio frequency. It is adjusted by the listener. At three different points in the receiver are circuits sharply tuned to the intermediate frequency but not adjusted by the listener. They are set once and for all at the factory, and to make full use of them, all that the listener needs do is to tune the oscillating detector Tube 2 so that it will produce the proper intermediate frequency from the incoming waves. This means, in plain language, that he simply turns a second knob until the signals are loudest. The listener therefore has only two tuning adjustments, and these are stable and definite. So that the intermediate frequency employed by this receiver enables the receiver as furnished to have no less than four sharply tuned selecting circuits in it, one after the other, and yet only two of which are ever adjusted. And the nature of these selec-

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tive circuits is such that the selectivity had to be carefully controlled and limited in the design in order to avoid making the set truly unusable because of excessive selectivity. This may sound like a joke to the broadcast listener who has been accustomed to present-day interference on existing receivers, but it is meant in sober earnest. The new superheterodyne responds fully to all frequencies in a band 10 kilocycles (10,000 cycles) wide, and does not respond at all to anything outside of this band. The actual receiver of a successful existing type falls far short of the requirements. In the first place, its curve is too sharply pointed at the peak, thus producing distortion of quality of music under some conditions. In the second place, the response of the receiver extends far outside of the band of frequency or wave length which is necessary and therefore it admits undesired signals and gives rise to interference and cannot be "tuned sharply." The super-heterodyne receiver admits a band of frequency or wave length just wide enough to enable radio telephone music to be perfectly reproduced and not a bit more. With the existing type of broadcasting transmitters, more selectivity would simply ruin the musical quality and not improve station selection in the least. In this respect of selectivity, the ultimate has been reached for today's transmitters. It is hardly necessary to point out what this means in increased enjoyment to the broadcast listener. One can listen to concerts from distant stations while nearby stations on neighboring wave lengths are going full blast, but without interference from them.

A startling instance of this was easy reception during daylight hours of WOO in Philadelphia, 90 miles away, on a wave length of 509 meters, with the receiver placed in the studio WJZ at Aeolian Hall. WJZ was operating at full power on a wave length of 455 meters, and the Radiola Super-Heterodyne was literally in the shadow of the antenna. Any ordinary receiver would merely have been paralyzed by the local signals. But the Super-Heterodyne brought in the station 90 miles away as if the station 90 feet away were not in existence.

Demand 4: "Of course, I also want to hear the nearby station without effort or trouble; but in addition I want to hear stations more than half way across the continent frequently, and now and then I expect to hear from Coast to Coast. My receiver must have an ear so sensitive that the whole United States is its sphere of listening.

Answer 4: The super-heterodyne Radiolas have six tubes, which actually do the work of eight or nine tubes in the older experimental super-heterodyne sets. Those who have been accustomed to what a high-grade four-tube or five-tube receiver can do should have some idea of what a perfectly designed set equivalent to eight or nine tubes will do in the way of distant reception. Loud speaker operation in wintertime on a loop from stations more than a thousand miles away, even in unfavorable city locations, is commonplace with such a receiver. Range is so variable a thing that the writer simply does not dare to tell of some of the stations heard on a loop with this set lest it be thought that the credulity of the reader was being abused. It is thought preferable to let the listeners using these sets tell what they can do in the way of record distances.

Demand 5: "Naturally I do not want to bother my neighbor when I am receiving a concert. I want a non-radiating 'Golden Rule' receiver which does not produce any squeals or other unpleasant noises in his receiver, so that he will follow my good example and will not bother me when I am receiving. My receiver must be perfectly quiet so far as everyone but myself is concerned."

Answer 5: The regenoflex feature of these receivers, by its use of a special muffler tube circuit, eliminates any radiation from the set. To illustrate what can be done, the antenna lead of a sensitive four-tube receiver was laid within a few feet of the super-heterodyne set. A station several hundred miles away was picked up on the four-tube set with loud signals heard throughout two adjoining rooms. Then the super-heterodyne Radiola was tuned all over its wave length range at full sensitiveness, and naturally getting the distant station in question as well as many others. In no case was there any interference noticeable with the four-tube receiver signals! Since the ordinary super-heterodyne receiving set is often a real menace to the neighborhood in the way of producing outrageously loud squeals in other people's receivers, it will be appreciated what a triumph of design has been obtained in the new regenoflex Super-heterodyne receiver which is non-radiating.

Demand 6: "I want to be able to take my receiver upstairs or down, or to my home or hotel in the country, and then to have it work just as well there as here at home, and without putting up any wires or changing any adjustments or settings, in other words to have a truly portable receiver."

Answer 6: It is obvious that a receiver that carries its own loop within it is a portable article and that its adjustments and settings are the same everywhere, thus making it entirely portable.

Demand 7: "I want the receiver to be constructed so that there are no wires to break off or become damaged, and so that the whole receiver is a damage-proof unit inaccessible to prying hands."

Answer 7: A real novelty in receiver construction has been adopted in the super-heterodyne Radiolas. The entire circuit parts, with the exception of two or three husky and larger elements,

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are enclosed in a heavy metal box where they are carefully wired and definitely adjusted. The entire circuit parts, with the exception of two or three husky and larger elements, are enclosed in a heavy metal box where they are carefully wired and definitely adjusted. The entire box is then closed by a firmly fastened metal cover, admitting only the tubes, and the box filled with a special wax. Thus the entire receiver unit is a block or solid mass, which is mounted on shock-absorbing springs thereby making transportation easy, and making sure of a quiet operation (free from "ringing"). This receiver unit, or "catacomb" as it is called, is permanent and readily replaced in the most unlikely event that it is damaged.

Demand 8: "I want to have the music of my concerts free alike from a tinny thin tone and a rumbling indistinct tone. It should be full, clear, and crisp in its quality. Every word of a speech should be understood without straining. My loud speaker in the receiver (or attached to it) should be only the voice of the original speaker transported to my home."

Answer 8: Loud speaker development has proceeded much further than the public and even most broadcast listeners realize. One sometimes hears the amusing and amazing statement made that the quality of radio music is not good. As the result of really elaborate and extensive researches, it has become possible to build very sensitive loud speakers which give satisfactorily even response to all notes from the lower in music to the highest. It is a fact that loud speaker quality is one of the most important parts of receiver performance, and it is therefore fortunate that loud speakers which are on a technical level with the super-heterodyne receiver have been developed for use with it and, in the case of Radiola Super-VIII, are included in the receiver cabinet.

Demand 9: "The quality of the music or speech given by my ideal receiver must be quite independent of any selectivity or other adjustment within the widest limits."

Answer 9: Everyone knows that, in an attempt to get more signal strength, or higher selectivity, or both, the broadcast listener with existing sets often ruins the quality of the incoming music or speech. This cannot be done in the super-heterodyne Radiolas. The quality on the one hand, and the signal strength and selectivity on the other hand, have no relation to each other so far as the receiver is concerned; and indeed the selectivity is constant and always at its highest value regardless of the way in which the receiver is used.

Demand 10: "I do not want storage batteries or battery chargers or resistance and switches near my receiver or in my home. It should be as easy to run my receiver as to put a new electric lamp in a socket or to connect a new battery to a door bell or to slip a new battery into a flashlight."

Answer 10: Dry battery tubes are used throughout. By placing proper circuit arrangements in the set, a large output at excellent quality is obtained from tubes which require only simple dry cells to be connected to labelled wires for operation.

Demand 11: "And my receiver must be beautiful and an ornament to my home. The critical members of the family must not object to placing it in the best room where it should naturally fit."

Answer 11: It is a fact that the housing or form of an instrument should express its use and also should be such that it will fit into its surroundings. A Radiola is a sort of musical instrument for the home, so that its cabinet or box design should be in the spirit of music and in the nature of a home furnishing. The design of the new cabinets have been based on the form of the stage of a theatre, the upper portion of the proscenium arch with its hanging curtain being the opening of the loud speaker, and the scene or lower portion of the stage aperature being the carefully refined receiver panel. Mahogany in one or two tones has been used throughout, and the ornamentation and lines of receivers are such as to relate them definitely to the living room in the home.

It may have been a source of astonishment to some that these super-heterodyne Radiolas have not appeared at an earlier date. Yet it would not have been proper to put on the market an elaborate eight or nine tube outfit, with difficult adjustments, with radiation from the set, and with other disadvantages. Years of experiment were required for a receiver which met the extremely difficult requirements set forth in this discussion. And, while it is a fact that "life is fleeting," it is also true that "art is long" and that "Rome was not built in a day." But, once built, such a receiver amply repays the effort spent on it by furnishing the broadcast listener with an instrument definitely in a class by itself.

North Sea Cables

NEW London-Germany Circuit.—A new direct cable between Dumpton Gap, Margate, and Emden was inaugurated on February 12th, when the first telegraph message was sent from Electra House, London, to Germany, *via* the Eastern Telegraph Co.'s system.

An' That's That

DISSATISFIED HOUSEHOLDER: "Do you mean to say that this meter measures the amount of gas we burn?"

Gas Collector: "I will enter into no controversy, sir; but I may say that the meter measures the amount of gas you will have to pay for."

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Interference from Radio Receivers

By L. W. Chubb, Manager, Radio Engineering Department, Westinghouse Electric & Manufacturing Company.

As the number of broadcast listeners increases, it is becoming more difficult to get clear uninterrupted reception of the radio programs in the congested districts of our cities. This is true in spite of the better and more powerful stations which transmit for our entertainment.

One of the greatest causes of the interference is the misuse of regenerative receivers. The newspapers today are condemning the regenerative receiver and advocating its elimination because of the interference that it creates. Conclusions have been drawn too hastily and my purpose is to show that in most cases the trouble is with the operator rather than with the regenerative receiver.

When tuned to a distant signal, most of you have noted loud or feeble whistling noises which change rapidly or slowly up or down in pitch or continue to blast a steady note. You have also noticed, if you use a regenerative set, that when tuning your receiver, with the regeneration or tickler too high, that similar and stronger noises are produced when the instrument is being tuned. These noises are beat notes, commonly called "birdies." They are the audible frequency difference between the inaudible high frequency wave transmitted from the broadcasting station and the inaudible high frequency of your oscillating detector tube. Thus, if the station is transmitted on a wave length of 300 meters, the wave frequency is one million cycles or vibrations per second. If your oscillating detector tube is generating a frequency of 1,000,512 cycles per second it is acting like a miniature transmitting station and within a short distance of your receiver the two sets of waves will combine and your neighbor, who may be tuned to the transmitting station, will hear a loud note of 512 cycles per second which is the difference between the two frequencies and which will give a sustained note having the pitch of upper C in the musical scale. You also will hear this whistle and as you change your tuning, the local oscillation frequency will change and the difference or beat frequency will go up or down in pitch. At a central point where the two frequencies are equal there is a quiet place called the "zero beat" on either side of which the beat note produced goes up in pitch until it can't be heard.

The regenerated detector tube in the reception of broadcasting gives an amplification equal to between two and three separate stages of radio frequency amplification and is, therefore, the most simple and economical method of receiving. Like all good things it has its abuses. In congested districts the music and speech from a broadcasting station is often distorted and rough, and the already mentioned beat note noises spoil the enjoyment when signals are tuned in by using the receiver in the oscillating condition or listening in zero beat, riding the wave, as it is called.

Disturbances of this kind are entirely unnecessary and it is hoped that they can be eliminated by a system of education on methods of receiving and by co-operation with your neighbor. Our experience has shown that many listeners do not know that the squeals which they produce in tuning their receivers are heard by others, and many do not know that the many noises which they hear are from receivers in the neighborhood. Such disturbances are then the result of ignorance rather than indifference. Everyone wants to be a good neighbor. If his birdies disturb others he should be told about it and told how to operate his receiver without producing them. In some districts the listeners have an understanding that they will hunt signals with the oscillating and that if a neighbor is disturbed he should signal back by purposely producing a succession of tweets. This practice, however, cannot be a solution of the difficulty for many receivers are in service which will not oscillate and it is impossible to give a signal of warning.

All tuned antennae radiate to a certain degree but radiation below the point of oscillation follows the variations of the incoming signal and causes no noise or distortion. Above the point of oscillation, however, the receiver gives an independent and sustained radiation which is dependent upon the tuning of the antenna circuit and which causes the disturbing noises.

The instruments which radiate are the regenerative receivers without radio frequency tubes in front of the detector. There are several types and many regenerative hook-ups which when improperly used give the trouble. The most common are the single circuit and various types of coupled, double and so-called three circuit tuners.

The worst offenders are the coupled circuit sets, especially the one tube and home made variety. When the two circuits are out of tune the radiation from such a receiver is not as strong as that from the single circuit. However, the trouble is more persistent, for it is almost universally used in the oscillating condition while hunting signals. Only the expert can handle such a receiver properly and unfortunately this type is prevalent in greatest numbers in congested districts where the added selectivity is desirable. With the circuits out of tune the radiation is weak in the antenna circuit but before the desired station is tuned-in by repeated trial adjustments, many more squeals have been emitted than with the single circuit even when improperly used. Noises are also made with the double circuit receiver when leaving a tuning position unless the regeneration is lowered first. If the first move is made by changing the tuning of either circuit, the tube will start to oscillate due to the decreased ab-

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sorption of the antenna circuit.

The home made set is a great trouble maker because the assembly of parts unsuited to each other results in unstable operations, howling due to blocking of tubes, and irregular and popping oscillation should start quietly when regeneration is increased and should stop immediately with decrease in regeneration. If the oscillation once started drags back, it is a sign that the grid leak, bias voltage, or plate voltage is incorrect. Such a receiver cannot be used for sensitive reception just below oscillation for static or the adjustment of nearby receivers will start it oscillating thus causing interference. In a well designed receiver, oscillation will start at substantially the same adjustment independent of the position of the tuning adjustment. This is an important feature as otherwise interference will be caused by repeated bursts of oscillation when tuning is changed.

We often hear the statement made that the noises which you make and hear yourself are the only disturbances which interfere with your neighbor's reception. This is not the case for the most terrible and persistent trouble is from riding the wave or zero beat reception. You may obtain quite clear music, for the beat note is too low to be heard in your receiver. A few wave lengths from you a neighbor receives your radiation and that from the station with the same strength. At times they add and give double strength and then they subtract and cancel the unmodulated carrier wave from the station causing a doubling of the pitch of the music momentarily. This modulation and distortion ruins the program at your neighbor's home without any apparent beat note, the low inaudible beat frequency being the frequency of the modulation and distortion of the wave. This trouble is not apparent at your own receiver, as the local oscillation is relatively strong and the periodic cancellation of the carrier wave does not exist.

The question before us now is what should be done to eliminate interference from receivers. The first suggestion is to legislate against the use of oscillating receivers. This is not practical, cannot be enforced and it is unfair to eliminate the most practical and economic device because it is capable of misuse. A parallel would be to pass laws requiring the removal of steering wheels from automobiles and compelling them to run on tracks, because by improper turning of the steering wheel damage may result. Learn to tune a regenerative set as the autoist learns to drive. Legislate against misuse. A farmer or rural listener causes no interference for he has few or no near neighbors and the simple and sensitive single circuit regenerative set is best suited to his needs, especially as great selectivity is not required. The experience in England shows legislation to be impracticable. At first all receivers were inspected by the Post Office Department and not approved if they could be made to oscillate the antenna. Today this part of the inspection and this requirement are ignored and the user is supposed to control his receiver.

Several newspapers and radio periodicals are conducting a campaign against radiating receivers. Many ridiculous suggestions are being made to change single circuits to double circuit receivers; to change inductively coupled feed-back to tuned plate feed-back, etc.

These suggestions and the general propaganda have been started and encouraged by those who do not appear. If the changes suggested are adopted conditions will be worse, and the desired effect of discrediting the Armstrong regenerative sets will be obtained at the expense of the general public.

Interference from receivers must be worked out carefully and quickly. If you use a regenerative set learn to tune it without oscillation. It will soon become a habit and quite as effective. If you are in a congested district and need additional selectivity do not change your single circuit to a coupled receiver. The added selectivity will be obtained at the expense of your neighbor.

Radio receivers like wearing apparel must be chosen to suit the location and requirements. Cost, simplicity, selectivity, quality of reproduction, sensitivity, ability to listen to distant stations through local broadcasting and other considerations will govern the choice of a radio receiver. Except in the congested districts of cities having two or more broadcasting stations where selectivity is required the regenerative receiver will continue to be used and if it is of the single circuit type it can be satisfactorily used without causing interference. Non-radiating sets should be used where high selectivity is desired and by cooperating with your neighbors the noises so common in the cities today can be entirely eliminated.

Printed Proceedings of the Telephone Pioneers of America

THE printed proceedings of the Atlantic City, N. J., convention of the Telephone Pioneers of America is now being distributed by the secretary, R. H. Starrett, 195 Broadway, New York. It is a book of 156 pages printed on heavy coated paper, and measures six and three-quarter inches in width by ten inches in length. It makes a splendid addition to the library of telephone people, and Secretary Starrett is to be congratulated on his latest efforts. The engravings of which there are many, show up beautifully which shows the care that has been taken in the preparation of this valuable work.

A. L. Salt is president of the Telephone Pioneers of America for the year 1924. He is vice-president of the Western Electric Company and his address is 195 Broadway, New York. Mr. Salt is an old timer in the electrical business and all of his friends and associates are standing behind him to make the reunion for 1924, a banner affair.

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Sholes Typewriter

By S. L. Robinson, Petoskey, Mich.

Your article in the February 1st issue referring to the first demonstration of the Sholes typewriter for practical use by E. Payson Porter brings back to my mind scenes of long ago.

I well remember watching Mr. Porter receiving telegrams by sound and copying with the typewriter, in the old exposition building on the lake front in Chicago. Probably no one present began to realize the future use of a machine then looked at as another novelty. Today, without it the business world would be paralyzed. Like Edison's phonograph when first demonstrated in Chicago, the few of us who were present considered it another curious toy. Then wireless. Now the radio.

We are surely living in a progressive age. About the only undiscovered thing, the Germ of Life. Again referring to the typewriter that yielded to the inventor a mere pittance while others have made millions by it, the inventor's son, Cass G. Sholes is living in Chicago earning a living as a clerk, a man seventy-nine years of age who ought to be independent rather than still doing a young man's work. Of those who were in the telegraph service in Chicago back in the sixties, I know of no other alive besides Cass Sholes and myself.

Both of us served in the United States Military Telegraph Corps all through the Civil War. No pension for that. If captured no exchange of prisoners for with one or two exceptions every Confederate operator captured took the oath, came North and worked for real money. When our government offered to exchange even a Confederate colonel for one of our operators, the reply: "General Grant can by a word make a colonel but it takes two or more years to make an operator." Hence some of our corps remained in a Confederate prison for many months.

While serving as operator and cipher clerk for Major General A. J. Smith, in July, 1864, after our command had been engaged with forces under General Forrest for two days at Tupelo, Miss., running out of rations we started back to Memphis, Tenn. General Smith sent me with two orderlies ahead with dispatches for General Grierson commanding our cavalry.

While riding single file through a bridle path in the woods we were ambushed. My orderlies riding in front of me escaped while I was shot, thrown from my horse and captured, stripped of all but my shirt and pants and left to die. My cipher book number 12 was captured but evidently my captors were unable to read and thought it a memorandum book only. My pocket telegraph instrument being in the saddle bags on my horse who ran away saved me being shot as a spy. Later a squad of our cavalry picked me up and took me to General Grierson's headquarters where my wounds were dressed.

One bullet cut out of my knee, one out of my body, two went through my leg above my knee, two through my arm and shoulder and two still in my hip. I took no anesthetic for fear the surgeon would cut off my leg. The only care afterwards was a little pad of wet lint on my wounds. I did not go to a hospital, being cared for by my associates in our telegraph headquarters in Memphis. For such service I am not entitled to membership in the Grand Army of the Republic or a pension, but for a month's service as drummer in the band and three months as bugler in the 1st Michigan Lancer regiment, that never left Detroit, I was a member of the army and entitled to a pension that I did not apply for until the only requirement, sixty-two years of age, over forty years after I was wounded. Justice blind! You have still in the telegraph service in New York another who lay in a Confederate prison for months—Charles W. Pearson—who took my place at General Hurlbert's headquarters after I was wounded. He was captured by General Forrest's cavalry when they raided Memphis. Pearson, asleep, was not allowed to dress but marched the next day with his only clothing a shirt.

Later, Pearson and I both came near going to the bottom in the Gulf of Mexico during a storm while on our way to Mobile. Yes, the United States Military Telegraph boys had a snap.

Telegraph and Telephone Life Insurance Assoc'n

Assessment Nos. 810, 811, 812 and 813 have been levied by the Telegraph and Telephone Life Insurance Association, New York, to meet the claims arising from the deaths of Edward W. Carman, aged fifty-seven years, Gardnersville, Nevada; David Hall, aged seventy-seven, St. Louis, Mo.; Peter Casserly, aged seventy-three, Morris Plains, N. J.; Washington G. Tintle, aged sixty-eight, Yonkers, N. Y.; Monroe M. Prescott, aged seventy-four, Glassport, Pa.; Edward W. Starbird, aged seventy-seven, White Plains, N. Y.; Jacob S. W. Phillips, aged seventy-five, Lumberville, Pa., and Jeremiah I. Lineham, aged sixty-five, East St. Louis, Ill.

West Indies New British Cable

A scheme is on the eve of execution which will provide an all-British route (by way of Canada) between Great Britain and the West Indies, the Imperial Government having decided in favor of such a route. The preliminary steps are now being taken to inaugurate the scheme, and Parliament will be asked in due course for legislative sanction. An outlay of about £335,000 is contemplated in connection with the project, which falls into two parts. The first provides for the laying of an entirely new submarine cable from Turks Island to Barbados, with spurs to Trinidad and British Guiana. At Turks Island the new cable will connect with the Direct West India Cable Co.'s line from Bermuda to Jamaica. The contract for this new cable has been awarded to Messrs. Siemens Brothers & Co., Ltd., whose tender amounted to £242,146.

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Assassination of Garfield

By R. W. Ledwith

A distinguished telegrapher entertainingly recited recently his impressions of Abraham Lincoln as observed in the government telegraph office at Washington, during the Civil War.

The writer is wondering if a recitation by a former telegrapher of the inner incidents of President Garfield's assassination, the second martyr, may not be interesting?

The recitation is a memory production. No data is available at the moment, but the writer had press privileges at the White House and resided nearby, 1420 New York Avenue.

General Garfield was a national character before becoming president; had a distinguished military career; came from an Ohio congressional district formerly represented by Joshua R. Giddings, a famous abolitionist, and by Senator Ben. Wade, vice president, when President Andrew Johnson succeeded Abraham Lincoln, and was the recognized floor leader of his party in Congress. And he was an orator of convincing power as was shown by his oration at the soldiers' convention in Pittsburgh in 1872 and that nominating Senator Sherman in the 1880 Chicago convention, which ultimately selected Garfield.

President Garfield was shot in the Pennsylvania depot in Washington about 8:30 a. m., July 2, 1881, and died at Elberon, N. J., in September following. The writer reached the White House at nine o'clock or a few moments later, and first entered the Blue Room, through which the wounded president was later conveyed to the living apartments on the second floor.

Meanwhile Secretary of War, Robert T. Lincoln with a company or more had taken possession of the White House and grounds, permitting no one to enter or leave without a permit from Secretary Blaine.

The president was brought into the Blue Room through a rear door on a stretcher. In the room at the time were Secretaries Blaine and Windom and Postmaster General James and several of the cabinet ladies, all hysterical and all in tears. The president, calm and cool, reclined on the right side, leaving his left arm and hand free. (This is disputed by some writers.) As the body was carried by those assembled the president raised his left hand and as if addressing Secretary Blaine remarked calmly: "I'm all right."

He was very pale, shirt thrown back from the neck and minus coat and vest, evidently to permit an examination at the depot. (This is also disputed by writers not present.)

Ten, fifteen, probably twenty minutes later a colored man entered the rear door holding in his hands a coat and vest which he mechanically thrust into the writer's possession and disappeared. The colored gentleman in his fright and agitation had turned almost white and trembled like a wind-swept leaf.

Meeting Postmaster General James, returning from the apartments above, the writer passed the coat and vest to him. Together we made a casual inspection of the garments. To the left of the buckle on the back of the vest was a hole, evidently made by the fatal bullet. (This too is disputed.) There was a small bouquet in the lapel of the coat.

Unable to depart the writer was looking out an open window near the portico entrance in the afternoon and observed a gentleman pass the guard at the gate. He wore a seersucker suit, panama hat and carried a palm leaf fan. The guard at the door declined to let him pass. Observing the writer at the window he came forward. The tears were streaming down his florid cheeks and in a voice trembling with emotion he asked: "How is the dear boy?"

It was Robert G. Ingersoll.

New Radio Stations

In order to provide for improved communication with and between the Windward and Leeward Islands, seven radio stations are to be erected respectively at Barbados, St. Kitts, Antigua, Dominica, St. Lucia, St. Vincent, and Grenada. This work will be carried out by the Radio Communication Company, Ltd., whose engineer was due to arrive at Barbados on February 15th. The amount of the tender was £62,760. It is being arranged not only that the islands shall be able to communicate with one another, but also with ships. The sites of the stations are to be provided free of cost to the contractors.

The General Post Office will supervise the execution of both branches of the scheme, and representatives of that Department are proceeding to the West Indies. As regards the erection of the plant, the engineers will be associated with representatives of the Pacific Cable Board. Two Bills have been prepared. One will confer the required power on the Pacific Cable Board, which will operate the scheme when completed. The other Bill will seek Parliamentary authority for the proposed expenditure, which allows £30,000 for contingencies. The arrangements outlined were completed by the late Government.

Electrical Aid Society of Philadelphia

The printed proceedings of the thirty-sixth annual session of the Electrical Aid Society of Philadelphia have made their appearance. The various reports of the officers who manage the Association's affairs during the past twelve months are printed therein, and the whole matter agreeable reading for the members of the fraternity at large, and the members of the fraternity of Philadelphia in particular. The telegraphers of the Quaker City ought to be proud of the achievements of the Electrical Aid Society of Philadelphia.

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A Califronia Trip

MAJOR and Mrs. Cecil W. Mackenzie of the Gilmour Road, are in California for the winter, having left Fort Erie on December 1st, and after spending a few days in Cleveland, Ohio, visiting relatives, went to Louisville, Ky., where they were honorary guests at a convention of the Southern Bell Telephone Company.

Next day they visited the famous Mammoth Cave which had closed, but the telephone officials at Louisville telephoned them that the Mackenzies had come all the way from Canada, courteously opened the cavern and they explored it for several miles, riding upon its rivers and seeing strange fishes and insects without eyes.

At Nashville, Tenn., they were the guests of descendants of President Andrew Jackson and were taken to the "Hermitage," the former home of General Jackson, and now the property of the State of Tennessee.

They sojourned for awhile at Mobile, Ala., visiting the home of Augusta Evans, author of "St. Elmo" and other stories, and arrived at New Orleans on December 15th, where it was found so interesting that they staged a week enjoying the old French quarter and its many places of historical interest.

Mrs. Mackenzie visited some of the Eastern Star Chapters and found that the work done was more like the Fort Erie, rather than that done in Buffalo.

A day or so was spent at San Antonio, Tex,, where they "Remembered the Alamo" and saw the many points of interest.

When at El Paso, Tex., they took a trip over the border to Jaurez, Mexico, and found a place apparently hundreds of years behind the times and many things of interest to the tourist.

They made a 120 mile detour over the famous "Apache Trail" and saw the great Roosevelt Dam and strange remnants of the Cliff Dwelling among the wild mountains and a rain coming up making the roads slippery they nearly went over a place called the Deville Canyon.

The Imperial Valley was crossed and the wonderful results of irrigation was shown in the units of cotton fields, orange groves, etc.

The Mackenzies then passed through 100 miles of Old Mexico via the Carriso Gorge and arrived at beautiful San Diego, California, where they passed a couple of days visiting the caves of La Jolls, Ramonas Marriage Place, Balboa Park, Coranado Beach and the numerous other places of interest and finally arrived at Los Angeles on December 22nd, and proceeded to the bungalow they were to occupy in a delightful little suburb about ten miles from the city.

Major Mackenzie makes his boast that he has not yet worn his overcoat, although in the evening it is really needed.

Mrs. Mackenzie visited the "Alexandra" Chapter of the "Daughters of the British Empire," and met Mrs. Joulette, the Regent of the U. S. Chapter, and there are seven chapters here.

The Maple Leaf Canadian Club meets once a week and the New York State also meets once a month, and they met many from Buffalo and Erie Beach and the chairman insists that all must get acquainted.

On New Year's was witnessed the great "Rose Tournament" at Pasadena and no doubt you have all seen moving pictures of the event and it is hard to describe its beauties, but the best thing to see in all of California, next to its wonderful climate, is the great "Mission Play" now in its 13th year and held at old San Gabriel, where the old mission of that name is located. It gives in detail the history of California and the founding of all the old missions along El Camino Real (Kings Highway).

There has only been one little rain shower (on New Year's Eve), and the whole country looks dried up. The Mackenzies get the Fort Erie Times and then keep in touch with the folks back East and are glad to learn of the retaining of the popular Reeve Barnhart and the Council of 1923, and that the sewer is to be completed at last.

Associated Press Sets New Moving Record

THE hum of news activity in the general offices of the Associated Press, 51 Chambers St., was hushed at 4 o'clock, Sunday morning, March 2nd. There was a switching of wires at a well worn switchboard and in the twinkling of an eye there was a crackling of resounding telegraph instruments in the Association's new home, 383 Madison Ave.

The transfer involved the intricate mechanical readjustment of the Association's news heart and the arteries of 90,000 miles of telegraph wires—enough to encircle the earth nearly four times. So carefully had plans been laid that when wires and cables were switched there was not the slighest interruption in the vast system, whereby hundreds of thousands of words of news are daily distributed on 120 circuits among more than 1,200 newspaper members of the world's largest news gathering agency.

The change to quarters that afford double the floor space was necessary to keep pace with the constant expansion of the service.

The first organization under the name of the Associated Press was the old New York Association, founded in 1848, when news was carried from incoming ships by carrier pigeons and courier before the advent of the telegraph, telephone, cable, wireless and radio.

The present organization, incorporated in 1900, had twice outgrown its home. Twenty-four years ago, when the general offices were at 195 Broadway, six or seven telegraph operators handled the limited flow of news over three circuits, and there were about 35 employees. In 1914, it was necessary to find larger quarters and the offices were moved to the Chambers Street address, where the floor space was doubled and the news facilities greatly increased.

The new Madison Ave. home has 21,000 square feet of floor space. There is about 150 employees in

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the New York headquarters. Forty operators on 20 circuits handle the daily news output, which goes to every State and territory in the Union, the Central and South America, and through allied agencies, throughout the world. On four of these circuits there is a 24-hour service.

Experts of the American Telephone and Telegraph Company and the Western Union Telegraph Company had been working for three months installing new telegraphic and cable equipment.

The valuable news record of many years and other necessary equipment were gradually moved last week. At the instant "30," "the telegrapher's good night" was flashed over the wires at 4 o'clock on March 2nd an uncanny silence settled over the old offices, the task of collecting the next day's news was immediately taken up in the new home.

By the Sweat of His Brow

FROM one point of view, labor is the price we pay for living; from another, it is the penalty imposed in perpetuity upon the descendants of Adam in punishment of his sins; but from another, though rare, point of view, labor is among the chief pleasures of life. The pleasure derived from labor takes many forms; it comes in the form of the exquisite sensations that arise out of pure weariness; it is found in the excitement that accompanies all action; it comes from the intensity of concentration; we feel it when we contemplate a finished product and when we note the progress that is being made, and, finally, we take pride in the consciousness that we have and are contributing to the common effort and to the well-being of our immediate dependents. Men also find pleasure in doing things faster or better than their fellows, and also in striving toward these ends. Men who do very little work themselves have a great deal to say nowadays about the monotony of present-day methods of production. These men have no imagination. The chief barrier between the average worker and the pleasures to be derived from labor is mental; it is the product of the feeling of being oppressed that agitators have subtly planted in the minds of many workers. Most of the things that would tend to increase the interest of the worker in his work are under the ban of the disapproval of labor unions or are suspect because many employers have attempted to turn them to their own advantage. The shirkers, the slip-shod, the careless and all those who cannot or will not bear their share of labor also discourage and mar the interest and the enthusiasm of the workers who can get real pleasure out of their work. The slackers banter and chaff the workers, partly because of innate discontent and partly on account of their fear that the enthusiastic workers will set new standards toward which they will be required to strive in their own work. The unwillingness of workers to be exploited out of hand is understandable and commendable; the efforts of the agitators are twice rewarded where they encounter or can cite cases of exploitation. The laborer is worthy of his hire, and each man should be paid according to his efforts and results. But payment on that basis is also against the union rules. These observations apply to all workers—to white-collar workers, to so-called brain-workers and to practically all fields of labor where the individual is necessarily influenced by the views and the attitudes of fellow workers. Modern methods of production have caused us to lose sight of the essentially co-operative character of all productive effort. When the shoemaker sat at his last, when the tailor plied his needle and the farmer bartered his eggs or his butter for his shoes or a Sunday suit, it was easy for everybody to grasp the real meaning of labor, but it takes a little more imagination to see the relation between the farmer in the field and the operator of an automatic machine that day in and day out throws off the same minute part of a watch, a typewriter or a steam-tractor. Ten times in a hundred, the man at the machine never even sees the finished product to which he contributes a bolt or a nut. He does his bit, nevertheless; he even contributes more to the general welfare than the man who in other days turned off a finished product. He contributes more because he is a factor in producing more; he gets more himself and enables others to have more. The unimaginative say that the worker at the machine is cramped, that there is nothing to interest him in the operation he directs. Their idea seems to be that in order to obtain pleasure from his work, the machine operator ought to be able to stamp out a fully equipped automobile each time he pushes the button. But of all the pleasures that can be derived from labor, this one of being denied the satisfaction of contemplating the finished product is the only one that the machine operator lacks. He is compensated for this by the transference of his interest to his machine and to the operation—the contented worker can always find something to interest him in his work, for his content grows from his knowledge that he is doing his share of the world's work and making the world a better place in which to live for those who are to come after him.—*American Exchange National Bank.*

Possible West Indies Cable Sale

IT is possible that the cable linking France with the West Indies may shortly pass into American hands. The Compagnie Francaise des Cables Telegraphiques is at present negotiating with an American group for the sale of the cable, but no arrangement has as yet been arrived at. The French company points out that if the cession of the cable does in fact take place, the sum thus realized will be employed solely for the carrying out of improvements and extensions of the rest of its cable system. The Compagnie Francaise des Cable Telegraphiques is controlled by the State, and is subsidized by the State when its receipts are insufficient, but this has not been the case for some years. The State's consent to the proposed transaction, the company affirms, has been obtained.

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Canadian National Telegraphs

THE uniforming of telegraph messengers at all of the larger offices throughout Canada was completed during February. There are now four hundred messengers in the company's service outfitted, including uniform suits, overcoats, caps, leggings, rain capes and hats.

The appearance of these boys on the streets of every city has brought forth congratulatory expressions from all quarters.

During the week of March 17th, the new Union Station at Toronto will be open to the public for inspection. This depot is the last word in convenience and comfort for the traveller. The spacious concourse, waiting rooms, lunch rooms, restaurant, etc., are most impressive.

The Canadian National Telegraphs will establish a temporary office in the Telegraph Booth for the convenience of visitors and the distribution of advertising matter. It is expected that over half a million people will visit the new station during the week.

G. H. Stead, superintendent at Edmonton, recently attended the funeral of his brother in Montreal. The deceased was telegraph editor for the "Montreal Star," and highly esteemed in business and social circles. Deepest sympathy is extended to Mr. Stead in the sad and sudden loss of his brother.

F. A. Richens, formerly manager at Kitchener, Ont., has been appointed manager at Fort William vice T. A. Dalgleish. R. Groh has been appointed acting manager at Kitchener until Miss Moore, who is now on leave of absence, resumes.

The operating and plant superintendents of the four districts recently attended conferences in Toronto, during which plans for the coming year were discussed. It is the intention of the company to proceed immediately with inside installation and outside construction to meet the needs of the service this season.

The Canadian National Cricket Club held their second annual euchre and dance at the Community Hall on March 4th.

Through the excellent support of the staff the event was a complete success. There were over three hundred and fifty people present.

The euchre was very ably taken care of by J. R. McClelland, and the prize winners were as follows:

Ladies' first prize, Mrs. Arnott; ladies' second prize, Mrs. McCutcheon; ladies' third prize, Mrs. Cairney. Gentlemen's first prize, E. Tennyson, chief clerk to General Superintendent of Telegraphs; gentlemen's second prize, C. V. Hodgson, Toronto office; gentlemen's third prize, R. C. Richards.

While the euchre was in progress Herbert Power's orchestra was dispensing music in the dance hall where a very large number of guests were having a thoroughly enjoyable time.

Colin Gourley kindly donated prizes for a lucky number dance, which were carried off by Jack Square, of the Telegraphs, and his lady friend.

During intermission, while refreshments were being served to the dancers, the euchre prizes were presented by A. C. McConnell, secretary and auditor of telegraphs.

The refreshments were very ably handled by the wives and sisters of the members of the club, and the success in this department was largely due to the untiring efforts of Mrs. J. H. Jones, Mrs. Donald Ross, Mrs. J. Russ and Miss Radford.

This event was undoubtedly the most successful ever arranged by the Cricket Club, everybody apparently enjoying themselves to the fullest extent.

It is hoped that the club will receive the continued support of the staff, and that many more pleasant social events will be arranged.

THE first five games of a series of ten home-and-home games between the high average players of the Canadian National Railways Bowling League of Toronto and Montreal were rolled off at the Athenaeum alleys on Saturday afternoon, February 23rd, with the Toronto representatives taking all five games from Montreal, also beating the Montrealer's by a total of 389 pins on the five games, the totals being: Toronto, 5311: Montreal 4922.

For Toronto, W. Slack rolled 855 for four games, all 200 and over: D. Wilson, 1,129 for five games, with 204, 265 and 305 as highest: N. Lloyd, 746 for four games: S. Riddell, 1,017 for five games, with games of 207, 226, and 233. E. Lavery substituted in the fifth game and spilled them for 249. H. Clark, with a 1,136 for five games, had high games of 227, 234, and 315.

For Montreal, E. Legassic topped his team with a total of 1,119 pins for five games which included high games of 204, 255 and 304. H. Pearce was next, with 1,077 for five games, including 214, 264 and 268. H. Carrington 963 for five games: M. Flett, 763 for four games: E. Ramage 371 for two games, and C. S. McLean, 541 for three games.

The team totals were: Toronto—939, 1,165, 991, 982, 1,234. Montreal—926, 1,039, 935, 972, 1,050. After the match the Montreal bowlers were entertained at a banquet, and later at the Hamilton-Toronto hockey match, at the Arena. The return match in Montreal took place on Saturday, March 1st.

The Adventures of a Boomer Operator

"The Adventures of a Boomer Operator" is the title of a popular story book placed on the market by Marcus E. Smith, a well known knight of the key now living in Wyoming. The book is humorous and is designed for telegraph operators. It is a book of fun from cover to cover and there is a laugh in every line. The book is bound in a substantial cover and is fully illustrated. It consists of ninety-four pages and measures five and a half inches wide by seven and three-quarter inches in length. The book is well worth the dollar asked for it. The price is $1.00 per copy mailed parcel post to any point in the United States and $1.15 per copy to Canadian points. Copies may be obtained from Telegraph and Telephone Age, 253 Broadway, New York.

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Statement by Godfrey Isaacs

THE general public is not interested in the controversy between the English Post Office and the Marconi Company, but what the public is interested in is that the Empire shall have the benefit of the latest, most efficient, most rapid, and cheapest means of wireless communication.

Mr. Marconi was the inventor of wireless telegraphy, and he and the company have been the pioneers in establishing wireless telegraph services both over short and long distances. Their knowledge and experience must have a value, and had they been either called before the committee or consulted by the committee, it is very unlikely that that committee's report would have made the recommendations it has.

While it is true that they had under consideration the correspondence which had passed in regard to the agreement there is no reference in this to any matters relating to the technical aspect of the question.

The committee states that their main reason for recommending that the Post Office construct and operate the stations in England which are to communicate with the Empire is, that they thereby avoid any delay in the creation of this Empire service. In our opinion the agreement which had been reached on all material questions between the Post Office and the company as to the actual operation of the services, could have been, and could now be, completed within forty-eight hours, and in this way the whole Empire chain of stations could be proceeded with immediately.

If, however, the recommendations of the committee are acted upon there must be inevitably very considerable delay for a great deal of complication must arise in the Dominions which may require considerable time to overcome.

If the Empire services are to work smoothly and with the greatest technical efficiency, it is obviously essential that they should be constructed in such a way as to make inter-communication easy. This can only be secured by the adoption of a common plan of construction and a common interest in operation. To attain this all the stations must include the most recent developments in the practice of wireless telegraphy.

There is nothing in the report to show that the committee is aware of the work which Mr. Marconi has been conducting for some time past, and which is about to be put into actual working operation. This new system promises to revolutionize the entire practice of wireless telegraphy. It ensures much greater secrecy, a rate of working far beyond anything yet achieved, a marked reduction in the cost of construction of stations, besides great economy in the operation of them.

It is the company's intention to make provision in the construction of the station under erection in South Africa for the introduction of this new system. If it builds the stations in the other of the Dominions and India, these also will be so planned as to give to these stations the benefits of the new system.

Unless the stations in England with which the Dominions stations will have to work are similarly planned, it would be impossible to give to the Empire services the overwhelming advantages which this system ensures.

In its foreign services the company would include the new system in its own stations in England and in the stations abroad. These services would therefore be working at the high speed, reduced cost, and increased secrecy which the system ensures. It would, indeed, be regrettable if the Empire services are to be conducted on a lower technical plane and at higher cost than this country's foreign services.

We are not fully informed as to the plans of the Post Office stations, but the opinion of our technical advisers is that they would require substantial reconstruction before they could incorporate the new system of transmission and reception.

This new system is the opening of a new era in wireless telegraphy and it is not until it is in actual operation, conducting services continuously, that the opportunities are afforded of introducing the many improvements which are sure to develop month by month.

Any stations which the Company may construct will have the advantage of these developments as soon as practical experience justifies their introduction.

The committee recommend that full advantage be taken of the Patents and Designs Act 1919, Section 8, under which the Crown can acquire the use of all patents and inventions. The Crown has always had this power since the Patent and Designs Act of 1907. The mere right to acquire a patent no doubt has a certain value, but what is much more important than the right to use the patent is the practical knowledge of its operation and of the working of the whole system of which each patent forms only a small part.

In our judgment it is absolutely vital that the British Empire should have the most perfect system of wireless communication which modern invention and actual practice in working of telegraph services can produce, but this can only be secured if all the stations, whether in this country or in the Dominions, are controlled and directed by men who have at their finger tips complete knowledge of what modern invention has done and of what the most recent practice actually teaches.

The working agreement which would have been and could immediately be entered into between the Post Office and the company, if extraneous matters are left to arbitration, would ensure the Empire having all these advantages in its wireless communications.

The committee would appear to have read into the company's letter to the Post Office of January 26th the raising of a legal issue. In this they are mistaken. The company has not raised, and does not wish to raise, any legal issue. What they did do

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was to appeal to the Postmaster General not to insist upon imposing conditions to the issue of licenses which had no relation at all to the working of a wireless telegraph service conjointly with the Post Office, and they merely quoted the evidence given by an ex-secretary of the Post Office in support of this plea.

The company hopes that before any final decision is taken upon the committee's recommendations they will be given an opportunity of stating their case.

Ben W. Colley

BEN W. COLLEY of New York, for many years superintendent of the Commercial Cable Company at Midway Islands, North Pacific Ocean, now retired from the service, writes from Cannes, France, where he and Mrs. Colley are passing the winter, that taking the exchange into consideration, food is cheaper in France than in New York, but compared with prewar prices the cost of living is very high.

The French, Mr. Colley says, are wonderfully thrifty people and waste nothing, but still one wonders how they get along with salaries so low and prices so high.

"I go for some nice walks," says Mr. Colley, "and I find the country very much different from the Otsego hills of New York State. Round here it is very hilly and the hills are terraced. In some instances I expect the terracing was done hundreds of years ago. The land is cultivated by small holders. Some are given up to flower cultivation, others to vines and a few to vegetables.

"The vines are all leafless and cut back now, but will put on new life in a few weeks. Hardy vegetables such as peas, radishes, artichokes and the like are just coming along. Olives are cultivated very extensively. Nearly every terrace has a few olive trees and on some parts of the hillsides they grow quite thickly.

"Above the olive belt there are pines and other hardy trees. There are numerous cork trees, small ones. I do not think it is much of an industry. There are no dairy farms around, but a few miles away they go in for that industry. The milk is good but cream is practically unknown.

"One of the interesting things about going for walks is the number of old places one sees. Cannes is not as ancient as some of the neighboring towns. Antibes was founded by the Greeks or Phoenicians before Roman times, its old name, Anti-Polis, shows its Greek origin. The ramparts, towers and aqueduct built by the Romans look as strong as ever and must have been quite a good defense in those days.

"Several of the church towers were built during the middle ages as protection against pirates and other marauders. On an island at the entrance of Cannes there is a monastery that was founded about 375 A. D. by St. Honorah and has been a monastery ever since, except from about 1787 to 1861. The remains of the old buildings are embodied in the present newer buildings.

"The tower built in the tenth century is still intact. I visited the island and was shown great courtesy from one of the monks, who related much of its history.

"The history of these monks is just one raid after another, not only by Saracens, Turks and others, but by fellow Christians, when all they wanted was to be left alone to worship God according to their own belief and idea. In spite of the dreadful war of 1914-18 I think the world is getting better. People do not murder other people now unless a state of war exists.

"Altogether the country is very different from our side of the Atlantic and yet there are many resemblances. One dodges automobiles just as in little old New York and human nature is always human nature. The country seems prosperous. Everyone is at work. There is no unemployment and they believe thoroughly in themselves which is a good trait."

Mr. Colley tells of the great quantity of beautiful flowers and the approaching festival known as "The Battle of Flowers." The temperatre during the day is between 55 and 60 and at night about 35.

Radio Corporation of America Athletic Club

THE Radio Corporation of America Athletic Club held its first meeting and organization at 64 Broad Street on February 26th.

The meeting was well attended by an enthusiastic body of male employees of the Radio Corporation of America representing all departments and offices.

The purpose of the organization will be to further the good fellowship of R. C. A. employees and the promotion of athletics.

The meeting was called to order by Mr. Anderson and a board of governors was temporarily chosen to function until a regular meeting will be called, in the near future, at which time it is expected the election of permanent officers will take place.

W. A. Winterbottom was unanimously elected chairman of the board.

The other representatives follow: Vice-chairman, Mr. Joel, Sales Department; general secretary, Mr. Calvin, Bush Terminal; treasurer, Mr. Payne, Treasury Department.

The following committeemen will represent each department: Sales Department, Mr. Tinsley; Sales and Audit Department, Mr. Cooper and Mr. Ulrich; Transoceanic Department (Audit), Mr. Carney; Engineering Department, Mr. Rehm; Traffic Department, Mr. Barsby; Sales and Service Department, Mr. Landskron; Bush Terminal, Mr. Walter; Operation Department, Mr. Wheeler, Mr. Shay and Mr. Lynch; Advertising and Publicity and Wireless Press, Mr. Lunstead.

No Excitement

"WHAT's all this noise about, you young rascal?"

"Well, Mary said if I kept on crying a great big mouse with big green eyes would come and sit on the end of my bed, and I've kept on, but it hasn't come yet."

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EDITORIAL COMMENT

Speeding Up the Telegraphs

It is announced that the International Telegraph Union at Berne is proposing a world inquiry into the growing neglect of the telegraph in internal and international communication.

In some countries, such as the United States and Scandinavia, the telegraph now contributes hardly more than 1 per cent. of the total number of electric communications, and in France, where lack of enterprise still leaves over 40 per cent. of the 36,000 communes unserved by the telephone, the proportion is only about 10 per cent.

The air-mail is mentioned as becoming a powerful rival to the telegraph wire. A letter posted in Paris at 7.50 P. M. is now delivered at Casablanca, in Morocco, on the following morning but one, which is not always, but is sometimes, as rapid as the telegraph, and has other advantages.

In a single month last year 200,000 communications were sent by this air route. The use of wireless telegraphy is growing very rapidly. The great station near Bordeaux sends messages as far as Saigon. Saint Assise serves America, and Lyons, Moscow and Central Europe.

It is suggested that if the plant and cables of the old system representing hundreds of millions are not gradually to be scrapped, tariffs will have to be reduced, and the service everywhere speeded up. In France it still often takes five hours to telegraph between Paris and Nice, and this is only an instance of the wide margin left for reform.

Wireless Relaying Avoided

During the voyage of the White Star liner Olympic, which arrived at New York recently, messages were dispatched at a distance of 700 miles from the land station at Devizes.

In the ordinary way they would have been deciphered by an operator at Devizes and then telegraphed to London. Instead they were automatically transferred from the aerial of the station to telegraph wires and flashed into the telegram receiving department at the General Post Office. Here they were spelt out automatically by means of the Wheatstone and Creed machines.

The experiment, it is understood, was not a great success, but further trials are to be made. If this automatic system can be perfected its principal advantage will be the delay avoided by the elimination of the services of the operator at Devizes in deciphering and relaying the messages.

First Cable Steamer Built in Holland

On February 7th and 8th the cable steamer Zuiderkruis, built by the Netherland Shipbuilding Co., at Amsterdam, for the Colonial Department of the Dutch Government, successfully passed trials on the North Sea.

She is the first cable steamer constructed in Holland, and will be used for laying and repairing submarine cables in the Indian Archipelago. Her length is 88.70 metres (291 feet), beam 11.20 metres (36 feet 9 inches), and depth 6.75 metres (22 ft. 2 in.). On a displacement of 2,612 tons her draft is 4.30 metres (14 ft, 1 in.). Mountings for two 6-inch guns have been provided.

The cables are stowed in three tanks, and led to stem or stern by sheaves and rollers. The cable machinery for the ship was supplied by Messrs. Johnson and Phillips, of London.

In addition to accommodation for crew and personnel engaged in cable operations, a few reserve cabins and saloon for passengers have been installed. The ship is fitted with electric light throughout.

She has twin propellers, and two triple expansion steam engines of 800 r.h.p. each, constructed by the Werkspoor Co. On trials a mean speed of 12½ knots was attained.

Appreciated Testimonial

O. C. Greene, formerly and for many years superintendent of telegraph of the Northern Pacific Railway, retired for the past ten years, in renewing his subscription for another year writes as follows. "I was quite interested in the account and picture of the messenger boys of the St. Paul office, in the February 1st number of your paper. It carries my mind a long way backward to the almost prehistoric days when I ran the St. Paul office for a time in 1864. I kept the books, took press report and had but one messenger boy, George Harris, who I presume had more spare time on his hands than anyone of the small army of the present day.

Charles Weller's reminiscences have also been read with pleasure. He does not, however, mention the incident of his going to St. Paul about this time with a view to taking the managership, but which he declined after looking the ground over.

Byron A. Squies was then manager. He was relieved by Edward Curry from Cobourg, Ont., who remained as manager at St. Paul, for many years, finally leaving there to become assistant secretary of the old Northwestern Telegraph Company, at Kenosha, Wis., but I will not afflict you further with my memories at this time."

West Indian Cables

The Compagnie des Cables Telegraphiques held a meeting on February 23rd for the purpose of considering a proposal to authorize the directors to dispose of the company's West Indian cable, concerning which negotiations have been proceeding with an American group, The All America Cables, for some time past. It is reported that the price to be paid for the cable is approximately 2,500,000 dollars.

Riches cannot rescue from the grave, which claims alike the monarch and the slave.

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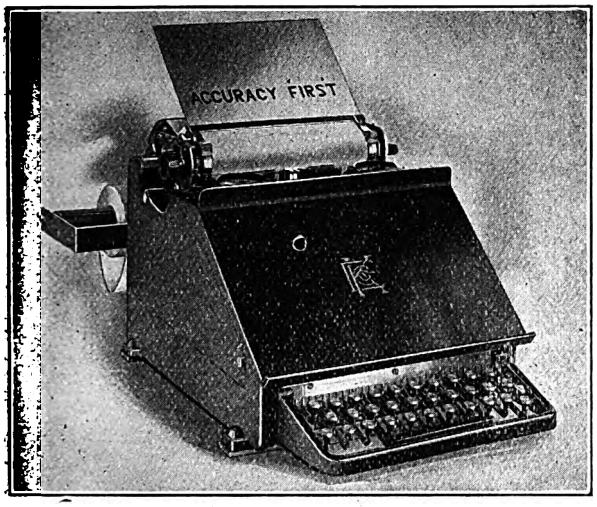
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER



AN ENTIRE SYSTEM
IN
ONE SIMPLE TYPEWRITER UNIT
Not Merely A New Design.
A Revolutionary Change.
The Unit that proves in on lightly loaded circuits.

Kleinschmidt Electric Co.
LONG ISLAND CITY, NEW YORK

HALL SWITCH & SIGNAL CO.

Garwood, N. J. Chicago

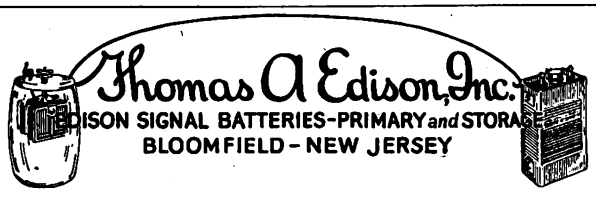
MANUFACTURERS OF THE

GILL SELECTOR

THE UNIVERSAL SELECTOR
FOR
TELEGRAPH AND TELEPHONE

EASE OF INSPECTION

Little attention need be paid to Edison cells once they are set up. Panels in the lower portions of the zinc tell the condition of the elements. The first perforations appearing in the panels warn that the elements are approaching exhaustion. Supplied with heat-resisting glass jars, the elements in Edison cells are easy to inspect at all times, even though it is unnecessary to inspect them until they approach exhaustion.



ST. LOUIS
Railway Exchange Bldg.

CHICAGO
Peoples Gas Bldg.

SAN FRANCISCO
Balboa Bldg.

2004-36

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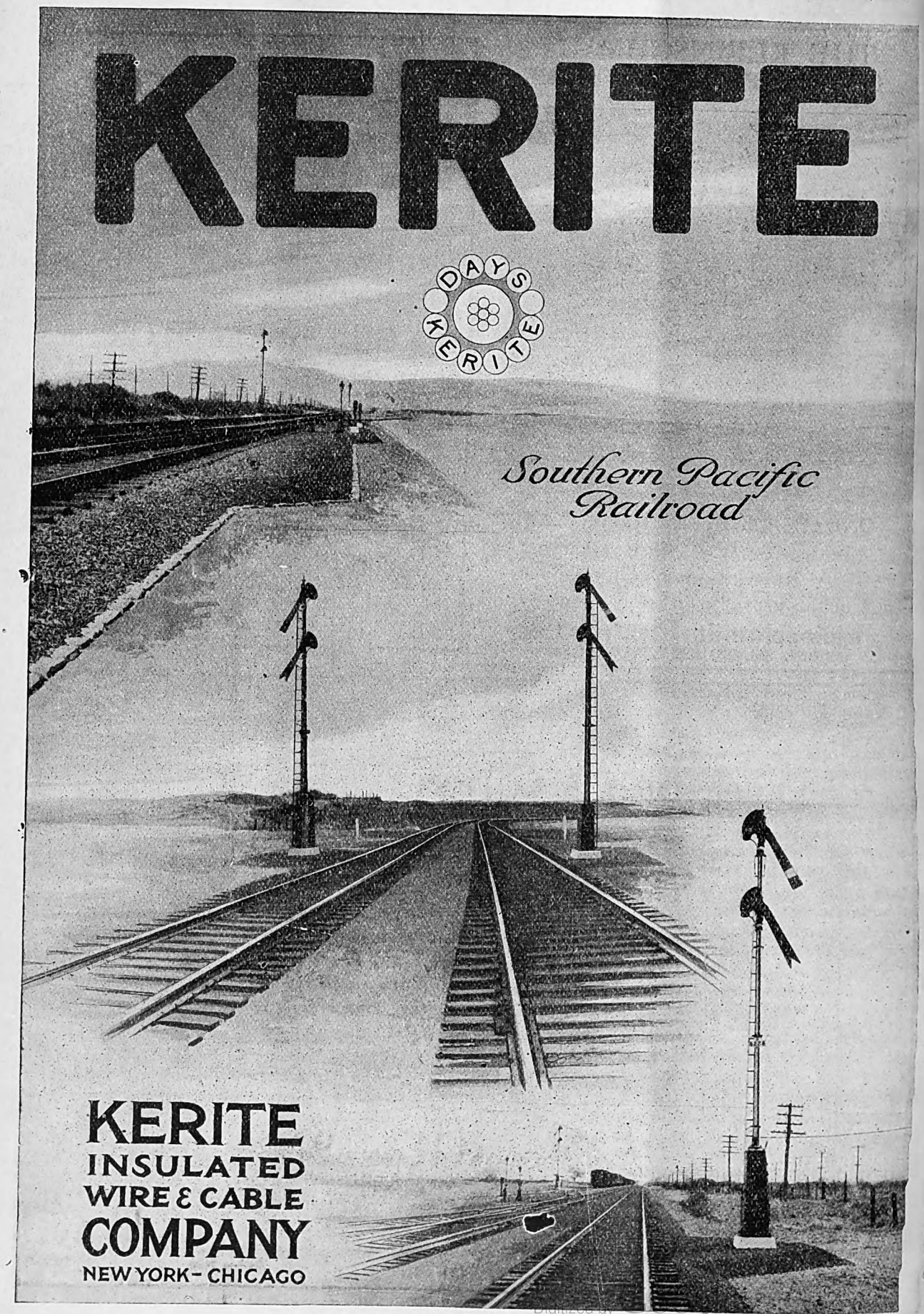
KERITE
DAYS
KERITE
Southern Pacific
Railroad
KERITE
INSULATED
WIRE & CABLE
COMPANY
NEW YORK - CHICAGO

THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

COMMITTEE No. 10—Education of Telegraph and Telephone Employees held a meeting at the Hotel Statler, St. Louis, Mo. on March 14th.

Committee No. 12—Radio and Wire Carrier Systems will hold a meeting in New York City on March 25th.

A meeting of Sub-Committee J—Circuits and Current Supply, was held at 431 South Dearborn Street, Chicago, Ill., February 25th and 26th. Those present were: Charles E. Davies, Toronto, Ont.; H. N. Todd, Toronto, and W. Rogers, St. Louis, Mo.

Sub-Committee K—Installation and Maintenance, held a meeting at 431 South Dearborn Street, Chicago, on February 29th and March 1st. Those present were: J. Miller, Chicago; R. H. Corson, Jersey City, N. J.; A. W. Douglas, Chicago; J. H. Hale, Chattanooga, Tenn.; R. A. Hendrie, Denison, Texas, and I. N. Tomlinson, Decatur, Ill.

A meeting of Sub-Committee on Circuits was held at 431 South Dearborn Street, Chicago, on February 27th and 28th. Those present were: Charles E. Davies and H. N. Todd, Toronto; A. W. Douglas, Chicago; R. A. Hendrie, Denison, Texas; J. Miller, Chicago, and W. Rogers, St. Louis, Mo.

Sub-Committee G—Apparatus, Material and Tools, held a meeting at the same place on February 25th and 26th. Those present were: G. R. Stewart, Chicago; E. V. Adams, New York; O. L. McCreary, Chicago; John Miller, Chicago; L. M. Richie, Cleveland, Ohio, and J. N. Schlentz, Chicago.

A meeting of Committee No. 11—Telegraph and Telephone Transmisssion, will be held on April 8th and 9th in the office of the secretary, 30 Vesey Street, New York.

A meeting of Committee No. 4—Electrical Protection, will be held sometime during April.

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JOHN D. FAIRBANKS, secretary and treasurer of the Amercian Railway Association, died at his home in Jersey City on February 24th. He also was secretary and treasurer of the Bureau of Explosives.

Mr. Fairbanks, who was fifty-three years of age is survived by his wife.

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John R. Smith Appointed Superintendent of Telegraph

JOHN R. SMITH, who was on February 1st, appointed superintendent of telegraph of the Southern Railway System, Lines East, with headquarters at Charlotte, N. C., was for many years associated with that great railroad system. He was born at Hampton, Va., on October 8th, 1889. He entered the telegraph service as a messenger boy in Washington, D. C., for the Postal Telegraph-Cable Company about November 1st, 1903. He became a branch office operator for the same company from March 1st, 1904 to September 1st, 1905, when he became identified with the general telegraph office of the Southern Railway System in Washington, D. C. He has held positions with the Southern Railway Company as follows: Operator, Southern Railway System, general telegraph office, Washington, D. C., September 1st, 1905 to September 2nd, 1909; assistant manager, general telegraph office, September 2nd, 1909 to June 1, 1910; night manager, general telegraph office, June 1st, 1910 to April 15th, 1917; manager, general telegraph office, April 15th, 1917 to February 1st, 1924, and superintendent of telegraph, Southern Railway System, Lines East, February 1st, 1924.

—o—

Appointment of Andrew W. Flanagan

ANDREW W. FLANAGAN, recently appointed superintendent of telegraph of the Southern Pacific Company, with headquarters at San Francisco, Calif., to succeed E. Entelman, who died on January 11th, is a native of California, having been born at Stockton on July 26th, 1880. Mr. Flanagan entered the telegraph service in the Western Union office at San Francisco in 1899, and was later appointed assistant superintendent of telegraph to Mr. Entelman, whom he naturally succeeds. Mr. Flanagan is one of the best known and best posted railroad officials on the Pacific coast and the Southern Pacific Company is to be congratulated on securing so able a man to head its telegraph department.

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Radio Corporation of America

E. J. NALLY, managing director of International Relations, arrived in New York from Paris on March 4th, on the steamship America. Mr. Nally is expected to stay in his New York office until some time in April.

General J. G. Harbord, president, was a speaker at the Massachusetts Institute of Technology Alumni Dinner at the Waldorf-Astoria Hotel on March 7th.

David Sarnoff, vice-president and general manager, also addressed a huge audience when his speech, given at the Alumni Dinner of the Massachusetts Institute of Technology on March 7th, was broadcast to a chain of relay stations by WJZ.

Captain R. H. Ranger, of the engineering department, is in Washington where he will address the American Institute of Electrical Engineers on March 11th. He is accompanied by his wife. J. L. Bernard accompanied the party, taking care of the publicity.

A. H. MORTON, has been appointed assistant director of traffic production of the Radio Corporation of America, vice Donald McNicol resigned.

—o—

Colonel Samuel Reber

COLONEL SAMUEL REBER, the new director of traffic production, Radio Corporation of America, New York, was born in St. Louis, Missouri, received his education in the public schools, Washington University and the United States Military Academy at

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West Point. After graduation he entered the Cavalry Arm of the Service and was subsequently transferred to the Signal Corps, from which he retired in November, 1919. He has served at home and abroad, in the West against hostile Indians, in Cuba and Porto Rico in the Spanish-American War, in the Philippines, and in France during the World War, where he had many important duties. In addition to serving with the 28th and 88th Divisions and the Headquarters of the Second Army, participated in the Meuse-Argonne offensive and was gassed in action. After the Armistice he was engaged in the repatriation of the American forces and subsequently when in command of the Intermediate Section transferred the larger part of the property, plants and supplies of the American Expeditionary Forces to the French Government. Colonel Reber has had charge both in the United States and abroad of the Signal Corps systems of communication, telegraph, land and radio, telephones, and cables, designed a large part of its electrical equipment and was a pioneer in radio development in the United States. Assisted by Prof. Karl Kinsley, Ph.D., he designed in 1900 the first successful American radio telegraph system and has been connected with the development of radio since that time. Among his important duties in the army he has been military secretary to its commanding general, a member of the General Staff at its organization, secretary of the Army College, in charge of aviation during its period of development previous to the World War, and with the Intercontinental Railroad Commission in Central America. He has been a vice-president and member of the board of directors of the American Institute of Electrical Engineers, is a fellow of that Institute and of the Institute of Radio Engineers. He recently, as the representative of the Radio Corporation of America in Japan, effected a new traffic agreement with the Japanese Government. He has been decorated by the French and Japanese Governments.

Listening-in On An Express Train in England

THE latest wireless development is the decision to install receiving sets on all main line trains. Successful experiments have been made.

A Great Western Railroad official of England who superintended a test on that line, said that while a train was standing in Paddington Station at 4 P. M., 2 L O was tuned in, and a loud speaker was successfully worked.

"As we moved out," he added, "there was no noticeable difference, and further out the Bournemou'h station also gave good results in the loud speaker.

"The British Broadcasting Company continued to broadcast music during the half-hour interval from 4.30 to 5 P. M.

"We picked up Birmingham half-way on the journey, although both London and Bournemouth were still coming in strongly, and Cardiff was also brought in 'o operate the loud speaker.

"Throughout the run we had the choice of at least two stations, and one of the most notable features of the reception was the absence of fading at any point and the remarkable freedom from atmospheric disturbance.

"Using headphones, we listened to transmissions from Ongar, Aberdeen, Newcastle and Paris, and from a number of ships, and the reception was excellent, the headphones excluding the noise made by the train.

"About 40 pairs of telephones can be operated from the set. The idea is to place the apparatus under the charge of a skilled attendant and to provide passengers with headphones at a charge of, say, 1s. for a journey."

The Great Western Railroad experiment was carried out while the train was travelling at 80 miles an hour.

Pullman cars in service on the L. N. E. R., the L. M. S., and the Southern Railway are to be fitted with wireless receiving sets.

The final tests will be made during the next few days. Head-phones will be placed in the cars for all who wish to use them, but it is unlikely that loud-speakers will be installed.

All America Cables

PLANT ENGINEER A. Crossman leaves Lima, Peru, on furlough in England.

Acting Manager P. Michell of Punta Arenas, Costa Rica, left for a short stay at San Jose, Costa Rica.

Acting Manager H. Backhoff of San Juan del Sur, Nicaragua, has left for a short trip to Rivas, Nicaragua.

R. L. McCann of the construction and maintenance department has arrived at Port au Prince, Hayti.

F. E. d'Humy, Author of an Inspiring Book

IN most large commercial organizations there is today charged to materialism, ego, acquisitiveness, and other characterizations of this order, much of the discontent and indifferent performance so prevalent among the rank and file of those carrying on the details of the world's work.

Thinking men—both those engaged in executive capacities and those in closer touch with the offices and the shops—have sensed that the one untried line of betterment remaining is that which recognizes the possibilities of improvement in the state of mind of the individual.

It is not necessary to be a sage or a philosopher to know that much of the woe through which many people imagine they are drifting is, in reality, a state of mind.

Mr. d'Humy has written a book which aims at a correction of this blight, which so insidiously slows up individual progress and individual realization of life's most agreeable gifts.

The title of this new book is "Conscience and Success." Copies may be purchased from Telegraph and Telephone Age, 253 Broadway, New York, at $1.00 each.

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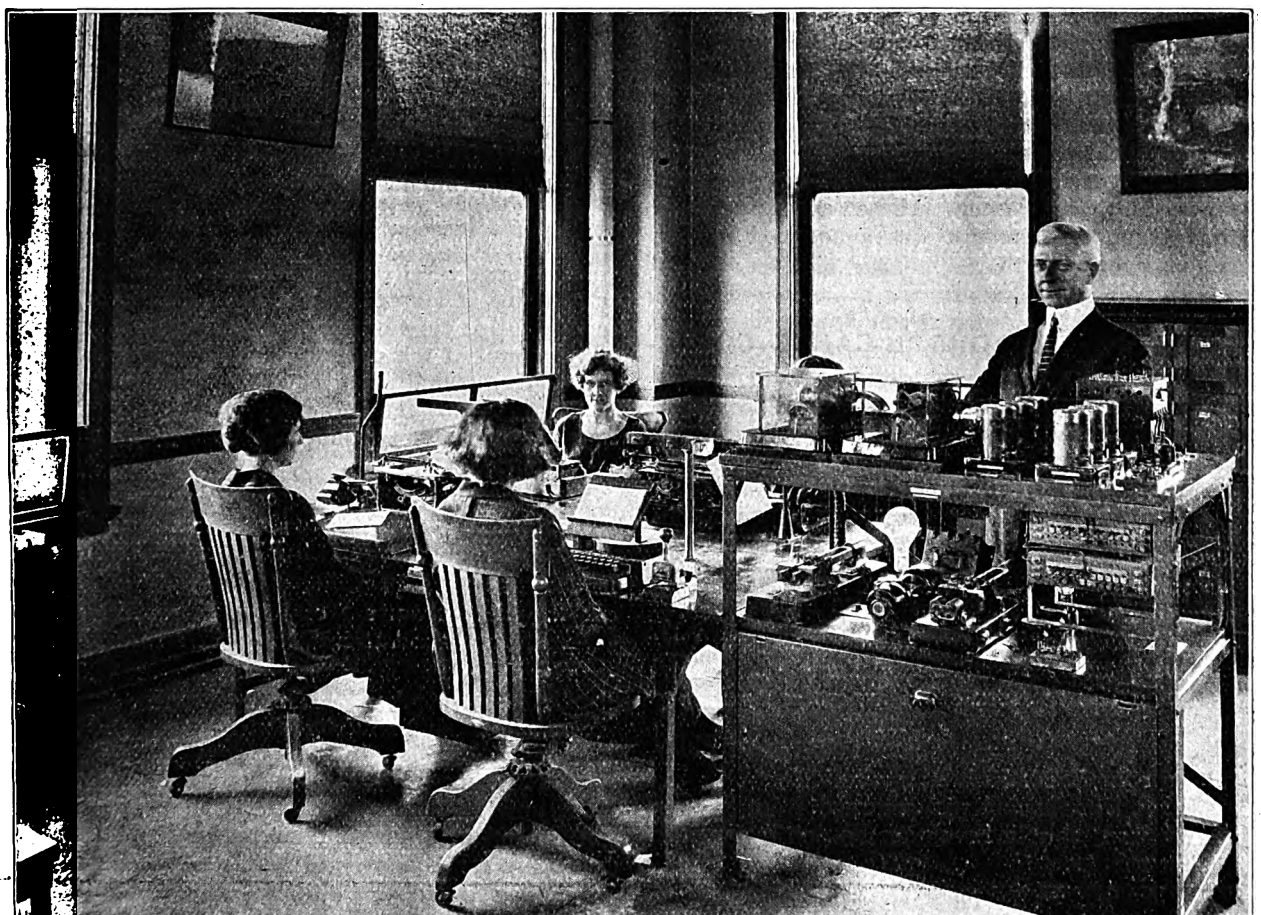
A Corner of a Modern Telegraph Office.



This shows a **MORKRUM MULTIPLEX** in the Omaha office of the **UNION PACIFIC SYSTEM.**

This two channel **MULTIPLEX** operates over a telephone simplex 1,000 miles long, between Omaha and Salt Lake, at a speed of 54 words per minute per channel.

There are two repeaters in this circuit and the **UNION PACIFIC** states that the **MORKRUM MULTIPLEX** handles their heavy traffic satisfactorily with no interference with telephone transmission.

In addition to the Omaha-Salt Lake circuit (**MORKRUM MULTIPLEX**), the **UNION PACIFIC SYSTEM** has in operation, **MORKRUM DUPLEX** circuits between Omaha-Cheyenne, Omaha-Chicago, Omaha-Denver and Omaha-Kansas City. These printer circuits have been in operation from three to seven years and are still rendering efficient and satisfactory service.

MORKRUM

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PERSONAL

DR. JAMES O. GREEN, aged eighty-two years, son of Dr. Norvin Green, president of the Western Union Telegraph Company from 1878, until the time of his death, February 12th, 1893, died in New York on March 10th. Dr. Green was well known in the city and was during his life time prominently identified with many social clubs. He is survived by his son, Norvin Hewitt Green, and his daughter, Eleanor Margaret Green, whose engagement to Prince Viggo of Denmark was announced by Dr. Green on February 9th.

POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice-president and general manager, has just returned from a combined business and pleasure trip to the winter social center of the east, Atlantic City.

J. McMillan, general manager of the Canadian Pacific Railway Company's Telegraphs, was a recent visitor at the executive offices.

Mrs. Anne S. Thornburgh, mother of E. D. Thornburgh, publicity manager, died on March 4th in the Mountainside Hospital, Montclair, N. J. Sympathy is extended to both Mr. and Mrs. Thornburgh in their sad loss.

W. P. Brown, assistant to Vice-President E. P. Tully, recently spent a week in Baltimore and Philadelphia on company matters.

F. P. Phillips, having just returned from Springfield, Mass., is now in Scranton, Pa., on a proposed joint line matter.

R. B. Naugle, of the plant department, is back at his desk after an inspection trip through Ohio.

New York City

A. J. DE STEFAN, formerly chief operator at the Produce Exchange, has been promoted to the Managership of the 317 Greenwich Street office.

Miss E. W. Koehler, night manager of the branch office in the Hotel Pennsylvania, died on March 9th after several weeks illness. Miss Koehler was loved by all who knew her and leaves an excellent record behind her.

F. Linquist, operator at the 145 E. 23rd Street office, recently resigned to devote his time to the study of music. His place has been filled by George Farnum Eno.

Austin F. Constantino has been appointed night receiving clerk at the Pennsylvania Station branch vice M. E. Charlberg, resigned.

J. M. Hart has been appointed operator at the 6 West 19th Street office.

Miss Helen Brazil is back as operator at the Pennsylvania Station.

ON March 1st deferred messages of the Postal Telegraph Commercial Pacific system were accepted at one-half the present rate.

The important places affected by the reduced rates are Honolulu, Manila, Hongkong, Macao, China, Japan, and Formosa.

Commercial Cable Company

EMILE RONOT, continental superintendent, with headquarters in Paris; Denis H. Walsh, superintendent at Waterville, Ireland; and Arthur W. Sunderland, superintendent of the London office, arrived in New York on the Steamship "Berengaria" on March 6th.

Mr. Ronot entered the service of the Company as an operator at Havre, France, on January 1st, 1885, and since that time has progressed in the Company's service until at the present time he holds the position of continental superintendent, having charge of all the affairs of the Company on the Continent of Europe. He was appointed to his present position on January 1st, 1911.

Mr. Walsh entered the Company's service at Liverpool, England, on December 24th, 1884, nad was transferred to Canso, N. S., on November 30th, 1891, as an operator. In October, 1902, he was transferred from Canso to Waterville. On January 1st, 1919, Mr. Walsh was appointed assistant superintendent at Waterville, and was promoted to his present position on September 15th, 1920.

Mr. Sunderland entered the service at Waterville, Ireland, on July 1st, 1891, as a check clerk and was appointed supervisor at that station on April 1st, 1919, and was transferred to London as assistant superintendent on November 1st, 1921. Mr. Sunderland was promoted to the superintendency at London, on October 1st, 1923, succeeding the late J. Wilkinson.

Another New Cable Ship

THAT the great cable concerns have not lost faith in the future of their enterprise is plainly demonstrated by the fact that no less than ten cable-laying and repairing vessels have been put into commission since the end of the great war. And now comes news of the eleventh, in the shape of the steamship Mirror, built by Messrs. John Brown and Company, Ltd., for the Eastern Telegraph Company, with the further news that two more cable ships are to be added to the Eastern Company's fleet within the next few months. Looking more like a private yacht than a commercial vessel, the Mirror is constructed to serve in tropical climates and will take up her station in the Red Sea. There is accommodation for a total complement of 89, with hospital, surgery, cable testing room, refrigerating chamber, large chart room, and the usual workshops and store rooms. In addition she possesses three cable tanks, two of which contain portable inner tanks, and her maximum capacity for carrying cable is over 500 miles. Cable from these tanks can be uncoiled and laid in deep sea at the rate of eight miles per hour.

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THE WESTERN UNION TELEGRAPH CO.

THE annual meeting of the stockholders of the Western Union Telegraph Company for the election of directors and inspectors of election, will be held at the Executive Office of the Company, 195 Broadway, New York, on April 9th.

LEE LEMON, who resigned his position as director of traffic production of the Radio Corporation of America, New York, last month, has entered the service of this Company, and has been attached to the office of James F. Nathan, general superintendent of the Metropolitan Division,

C. E. King, district commercial manager, was transferred on January 1st, to the district headquarters at Philadelphia.

B. B. Baker, formerly manager at Altoona, Pa. was assigned on January 23rd to the district commercial managership left vacant by C. E. King. Mr. Baker's territory is composed of the region west of State College and north of Pittsburgh, at which latter point he will have his headquarters.

P. J. Bailor, formerly senior operator at Altoona, Pa., has been advanced to the managership at the local office as a result of Mr. Baker's departure.

A. E. LITTLER, for a number of years office manager at San Francisco, has been advanced to the position of city superintendent, vice W. R. Edmondson, resigned. Mr. Edmondson will engage in the real estate business.

Death of A. C. Kaufman

A. C. KAUFMAN, general commercial agent, New York, died of heart failure while entering the building, 195 Broadway on the Morning of March 11th. Mr. Kaufman has travelled extensively throughout the United States, and was well known to the managers of the company in all sections of the country.

He was born in Clinton, Iowa, and entered the telegraph service in Canada, being appointed manager of a branch office in Montreal of the Dominion Telegraph Company. He later drifted to Pittsfield, Mass., where he was manager of the Commercial Union Telegraph Company, which was leased by the Postal Telegraph-Cable Company in 1892 when he was appointed superintendent of the Postal interests with headquarters at Albany, N. Y. In 1908 he retired from the Postal service and engaged in telephone work in Canada, which he continued until May, 1910, when he entered the Western Union service as special agent to the general superintendent in the Eastern Division, and on December 1st, was advancd to the position of general commercial agent.

ALBERT E. WILGUS, aged sixty-three years, after forty-six years continuous service as a most desirable employee of the Western Union Telegraph Company, died in harness at 9:45 A. M. on March 3rd. Mr. Wilgus began his career with the company on August 1, 1878, in the commercial news department as a ticker operator and ended his services while engaged in transmitting Liverpool cotton cables on the Cotton Ticker System. Funeral will be held from his residence in Brooklyn, on March 6th. He is survived by his wife and a daughter.

PLANS have been completed for the installation of a branch office pneumatic tube system in Cincinnati, Ohio. When completed, the system will provide service to eleven branch offices in the business section of the city. Large air compressors will be provided for regular operation of the system, with provision for emergency operation of the important tubes in times of power failure.

Work on the installation of additional and new pneumatic tubes to various branch offices in Cleveland is now well under way. In addition to the pneumatic tubes inside the main office, the new system will provide service to eleven branch office tubes in the business section of the city. Two large air compressors have been installed in the basement of the main office for regular operation of the system, with provision for emergency operation of the more important tubes in times of power failure.

In order to provide better pneumatic tube service, the Western Union Telegraph Company has recently installed two large air compressors, in the basement of the main office building at Minneapolis, Minn., to replace the small motor blowers that have been operating the branch office tubes at this point.

New Supply Warehouse, Atlanta, Ga.

THE supply headquarters of the Southern Division formerly located in the Western Electric Company's building were moved into a new building located at Glenn Street near Stewart Avenue, Atlanta, Ga. The building is a two-story brick and reinforced concrete structure with an approximate floor area of 18,000 sq. ft. (net) and was built to meet the telegraph company's requirements. Two loading platforms and a railroad siding are located along the east side of the building. The building is being leased for a period of twenty years.

All material is stored on steel shelving and placed so that it can be handled in the most efficient manner. A chute is installed between the second and first floors so that material for shipment can be sent to the first floor shipping department in the easiest and quickest way. An elevator with a carrying capacity of ten thousand pounds is also installed in the building.

The building is protected by a sprinkler system installed by the American District Telegraph Company.

The construction of the new building for the Western Union Telegraph Company on the southeast corner of Carondelet and Perdido Streets, New Orleans, La., is progressing rapidly. The building will ultimately be twelve stories high, but at present only four stories are being completed.

The limestone on Carondelet and Perdido Street elevations has been set up to the third floor level, and the north and east masonry walls have been completed.

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Hollow terra cotta tile floors are being installed. Conduit for wiring will be laid under the finished floor.

The installation of telegraph equipment will commence sometime during April.

GALLANT work was done by the Western Union management and the entire staff who worked like beavers under the direction of Manager Fletcher Ragland of the El Dorado, Ark., office, which was burned out on February 24th. Wire connections were resumed inside of a few minutes by the company through the use of the railroad wires at both the Rock Island and the Missouri Pacific stations. It is said that just thirty minutes after the fire, the first telegrams were being dispatched via the railroad wires.

That there be no unnecessary interruption to messages, night wires that had become lost due to the fire were repeated from Little Rock and got ten out with dispatch.

Later in the day, the new one story building located in the 200 block of South Jefferson on the east side of the street was rented by Mr. Ragland for the temporary home of the Western Union Telegraph Company. Meantime a later train had brought to El Dorado, R. E. Porter from Gurdon, division man, and the wire was connected up at the new quarters. Just at 5:30 o'clock the first wire was sent out from the new office, exactly 12 hours after the fire.

But one typewriter was saved and but little of the office equipment but other equipment was hastily secured and the business is today being conducted with almost the usual efficiency. Incidentally local business men are complimenting the company's management for the excellent work of meeting the emergency.

J. M. Delmar of Little Rock, District Commercial Manager, and J. J. Hilbert, of Dallas, plant superintendent, arrived a few days later to give attention to the work of reconstruction.

The new quarters of the Western Union Telegraph Company were equipped only last summer with the very latest in repeaters, motor generator sets and all that goes to make up a modern plant. The loss to these is heavy but still greater is the loss to the records of the company that are an irreparable loss.

A blanket insurance, carried in New York, embraces all the 3,000 branches of the company, hence no insurance was carried locally. Manager Ragland stated that some of the plant will be possible of reclamation and that the loss will run from $15,000 to $20,000 on the Western Union plant.

The Western Union office admittedly was one of the best equipped in the Gulf division of the telegraph company. It was equipped with three complete quad-duplex and one complete duplex in receiving and sending, three 160 volt dynamos, three 240 volt dynamos and one modern repeater table. Seven operators were employed.

Great credit is due Night Manager J. H. Lackey and Delivery supervisor R. W. Pietrusky, also credit is due Chief Operator W. H. Hanson and Night Chief J. Q. Ferguson for the establishment of circuits.

Urge Telegraph, Smaller Stock

"USE the telegraph to keep stocks replenished. It will save in investment and losses in price fluctuations and will give your customers better service and fresher goods."

That is the argument that R. W. Hewes, representing the Western Union Telegraph Company, is using with Fairfield, Iowa, merchants during a two-day stay in furthering a national movement.

"While our campaign is one of furthering self interest, it also is logical so far as the merchant is concerned, and certainly is of benefit to the consumer who gets quicker service and fresher stocks and styles," said Mr. Hewes.

"The merchant in the smaller city can purchase to the same advantage as his competitor in the larger city so far as deliveries and selection is concerned. He can get a number of garments on approval to show his customers, or, he can cut his stock investment and still have plenty of goods on hand to meet his needs," argues Mr. Hewes, who declares the telegraph tolls will be far overbalanced by the increase in profits.

———o———

C. V. AUGER, Southern divisional manager for London and South of England for the Western Union Telegraph Company, (Cable System,) sailed from New York for home on the steamship Majestic on March 1st.

———o———

Crippled Wireless Stations to Reopen

THE two wireless stations of Vera Cruz and Guadalajara which were damaged by rebels during their occupation of those two cities, will reopen within a few days, establishing communication with the western front.

It is said that the radio operators working for the revolution carried away important parts of the wireless installations to avoid their use by Government operators. Not only was service of these wireless stations crippled but all telegraph apparatus available also was taken.

The general manager of National Telegraphs suspended service in all its branches temporarily in order to use employees in Vera Cruz as well as in Guadalajara in completing necessary repairs to the radio station and telegraph lines. The parts which were removed from the wireless apparatus by rebel operators were kept in stock and were immediately replaced. Wireless communication will be available within the next few days, while telegraphic service has been satisfactorily established with the western sector.

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Utah Boys and Girls Who Talked by Lightning a Generation Ago

E. BURKE SPENCER of the Western Union Telegraph Company, Salt Lake City, Utah, has sent us a photograph of the boys and girls in Utah who talked by lightning a generation ago.

Reading from left to right—Top row—W. C. A. Bryan, Hattie Curtis, J. J. Fitzgerald, Anna D. Irons, Richard S. Horne, Anna Marie Larsen, R. E. Quarm, Emma S. Simons. Second row—Johnny Tempest, Mary Buchanan, Ellen Lunt, H. Thunnison, D. E. Thompson, P. F. Madsen. Third row—L. W. Johnson, S. D. Beebe, E. Burke Spencer, L. C. Mariger, Mary A. Layton, E. G. Taylor, M. B. Morrison. Fourth row—D. M. Tyler, Marie M. Miller, W. E. Maycock, G. E. Miller, Mrs. Carrie Straleson, K. Torgeson, N. J. Bates, Mrs. E. B. Bryan. Fifth row—H. E. Hatch, E. Evans, M. M. Findlay, John P. Bush, Miss Johnson, William F. Parr, Julia Budge, J. R. Donelson. The four on the left side, reading down—D. Egbert, Perry C. West, Lewis Anderson, H. J. Hill. On the right—J. C. Bentley, M. Smith, R. P. Morris, Ella Wilson.

The accompanying picture gives the features of all the operators on the Deseret Telegraph lines from Paris, Idaho, to St. George, Utah, in 1877 and was compiled by E. Burke Spencer, then chief clerk and operator for Superintendent W. B. Dougall, in the office of President Brigham Young. It required six months to make the collection. This gift was presented to Superintendent W. B. Dougall on Christmas morning 1877.

The Pinot Morse Printer

HITHERTO the only high-efficiency Morse printer capable of being used in cable and wireless telegraphy has been the Creed apparatus, in which the signals received are caused to perforate a paper tape which is afterwards put through a translator to obtain the printed slip. The apparatus devised by M. Pinot translates the Morse signals directly into typographical characters. If one transmits by hand with an ordinary Morse key, the record is made as regularly as with a perforated tape.

The apparatus consists of three essential parts: the regulator, selector-distributor, and translator. The regulator, automatically controlled by the speed of sending at the station of origin, is actuated by the signals received by wire or wireless receiving apparatus. The selector-distributor, driven by the regulator, sorts out the dots and dashes of each signal received, and the translator, electrically driven by the distributor, prints the corresponding letters on a tape. The printing characters are fixed on the periphery of a disk as in the type wheel of the Hughes and Baudot apparatus.

The inventor is engaged in making certain detail improvements which practice has shown to be necessary.—*London, Electrical Review, February 15th.*

MRS. E. L. CALLAHAN, aged sixty years, wife of E. L. Callahan, chief lineman of the Elgin, Joliet and Eastern Railway Company, Joliet, Ills., died on March 9th after a lingering illness.

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Telegraph and Telephone Life Insurance Association

THE fifty-seventh annual meeting of the Telegraph and Telephone Life Insurance Association was held at 195 Broadway, New York, on March 12th, Thomas E. Fleming, second vice-president of the Association, presiding.

Mr. Fleming called for the reading of the various reports of the officers, and all of them showed the Association to be in a good condition, notwithstanding the adverse conditions under which the Association had been contending during the past few years. The secretary's report showed a full-grade membership of 1397 on December 31st, 1923 and a half-grade membership of 172. During the year there were one hundred deaths in full-grade and four in half-grade.

The Third Division showed a membership of 2321 and twelve deaths were reported during the year.

The treasurer's report showed the total amount of the reserve fund as par value $311,050. The reserve fund of the Third Division showed a par value of $68,000.

The meeting thought it advisable to close the half-grade second division membership in the Association, and the two surviving members in that grade will be communicated with in regard to the matter.

The officers chosen for the ensuing year were:—

President, Thomas W. Carroll; first vice-president, Charles P. Bruch; second vice-president, Thomas E. Fleming; secretary, N. M. Giffin; treasurer, George K. Huntington; executive committee, E. J. Nally, E. P. Tully, J. J. Welch, T. M. Brennan, New York, A. J. Fuller, Chicago and G. Green; auditing committee, Charles E. Bagley, Philadelphia, chairman; E. B. Pillsbury, and G. W. Fleming, New York; advisory board, B. E. Sunny, Chicago; H. J. Pettengill, St. Louis; W. T. Gentry, H. C. Worthen, Atlanta, Ga.; Edward Reynolds and G. W. E. Atkins, New York; J. G. Blake, Chicago; Harvey D. Reynolds, Buffalo; A. B. Cowan, Denver, Colo. and B. P. Hancock, Dallas, Texas.

The meeting discussed changing the by-laws and on motion was adjourned subject to call of the chair.

Telephoning to Liners

FOLLOWING experiments conducted along the German coast last year, the German telegraphic authorities are now making preparations to establish wireless telephonic communication between liners at sea and telephone systems in Berlin, Bremen, Hamburg and other German towns.

It may be possible shortly, under favorable atmospheric conditions, for a passenger on a liner in the English Channel or some distance out in the Atlantic to ring up (via a coastal receiving station) a telephone subscriber in one of these towns, or vice versa.

Since the German wireless stations at Norddeich, Cuxhave' and Swinemunde were equipped last year with wireless telephonic apparatus continuous experiments have been made with a view to ascertaining at what distances it is possible to maintain wireless telephonic communication with vessels at sea.

Particularly successful results were obtained with the steamship Cap Polonia, en route to South America, and the liner Albert Ballin, bound for New York. It was possible, by means of the five kilowatt transmitter at the Norddeich station, to send messages which were clearly intercepted by the vessels when they were several days' journey south and west of the English Channel.

Electrification of English Railroads

JOHNSON and Phillips, electrical engineers of London received a large cable contract from the Southern Railway and the order constitutes a record in size from any British railway in connection with electrification.

The contract covers the supply and laying of as much as 125 miles of three-core high-tension cable. It is intended for the electrification of the whole of the Southern Eastern and Chatham suburban system between Victoria, Charing Cross, Holborn Viaduct and Cannon Street and Dartford, Orpington and Addiscombe Road, (London.)

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"Gained 30 lbs. in weight—Grip restored to the best. Sending and Receiving improved 60%. I advise every operator who is run down, nervous or suffering from loss of grip to take your system."

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CONTENTS

PAGE

David Sarnoff on the Future of Wireless 148
New Stock Issue Authorized by Westinghouse Electric and Manufacturing Company. Radio Printing 150
Wireless Communication in Mines 151
Western Electric Company 152
Taking the Church Into the Homes of the People 153
The Telegraph and the Typewriter. An Injunction Asked for. The Late Joseph Fisher. Short Cut to the Highest Degree of Shorthand and Typewriting Efficiency 154
Fifty Million Audience is Radio's Latest Feat. Limit Liability of Telegraph Companies 155
Radio Broadcasts Talks 7,000 Miles Without Wire's Aid. Greenwich Time .. 156
Annual Report for 1923 of the Radio Corporation of America 157
All America Cables. Powerful Wireless Station 158
"Coal Oil Johnny" and Oil. By R. W. Ledwith. Wireless Reception on Trains. 400 Words a Minute 159
Editorial Comment.—Wireless on the Train. Why Telegrams Never Arrive. Device Aids Telegraphy. West Indies. Ask Telegraph Firm Receiver .. 160
The Railroad-Telegraph and Telephone Section of the American Railway Association. Radio Broadcasting Station 163
Death of P. W. Drew. Pacific Cable Record. Prominent Engineers on Radio Committee. "Standardization." 164
Personal. Postal Telegraph-Cable Company. Clarence H. Mackay Champion at 50. By Samuel J. Brookman 166
Commercial Cable Company. Commercial Pacific Cable Company. Spring Dinner of the Magnetic Club. Telegraph and Telephone Life Insurance Association 167
Western Union Telegraph Company 168
The First Duplex. By Chas. E. Burroughs 169
Improved Cable Service to New Zealand. Too Much S O S 170

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DAVID SARNOFF ON THE FUTURE OF WIRELESS

In the course of his statement before the Merchant, Marine and Fisheries Committee on the hearing of the White Radio Bill, David Sarnoff, vice-president and general manager of the Radio Corporation of America, said:

"There is need for regulation, but the extent to which this regulation should go involves a delicate balance as between the benefits of private initiative, the evils of destructive competition, and the weakening effects of too much paternalism. Somewhere along the line a common sense compromise probably will be found.

In foreign countries the tendency has been toward licensing and taxing the owners of radio receiving sets. I am now and have been from the beginning opposed to any flare-back in this country against the freedom of radio. I believe, frankly, in the freedom of broadcasting and also in free speech from the broadcast studios.

While I recognize that there may be perfectly honest differences of opinion on these two propositions: first, that any one who owns a radio receiving set should be entitled to everything that comes through the air, and, secondly, that no political, religious, or racial distinctions should be drawn in this new forum of public expression, my own convictions are so definite upon each proposition that I have no hesitancy in restating them to the committee.

It has been said by a great many people and a great many corporations, some very large and able, that broadcasting depends upon a solution of the problem whereby the consumer will pay for the entertainment which he receives. In other words, it has been said that unless some method is provided whereby a means is created for collecting revenue from the user of a broadcast receiver, that the whole industry is founded on sand, and that it is bound to collapse in time, because there will be no means of supporting it.

"Narrowcasting" Opposed

I want to go on record very definitely today, as I have already done in addresses made to the electrical jobbers in Buffalo last November, and to business men in Boston in December, and at a meeting of farmers in Columbia, Missouri, in January, in saying to you that it is my firm conviction that that sort of solution to the problem is not necessary, that broadcasting can be made commercially practicable without any means being found for collecting from the consumer, that the greatest advantage of broadcasting lies in its universality, in its ability to reach everybody, everywhere, anywhere, in giving free entertainment, culture, instruction, and all the items which constitute a program, in doing that which no other agency has yet been able to do, and it is up t us, of the Radio Art and Industry with intelligence and technique and broadness of spirit and vision as to the future, to preserve that most delightful element in the whole situation—the freedom of radio.

Just as soon as we destroy that freedom and universality of radio and confine it to only those who pay for it—those who pay for the service, in other words—just so soon as we make of broadcasting "narrowcasting" we destroy the fundamental of the whole situation. And, therefore, I believe very definitely that broadcasting as constituted today is commercially sound, and that it will remain so in the future, although there may be selective methods and narrowcast methods which will do no harm. These may supplement the situation. There may be wired-wireless and the like All of these will make their contributions. But fundamentally there will remain, and there must remain and be preserved that element of the broadcast situation which makes it possible for grand opera to go to the slums and to the districts of the poor as well as the rich, everywhere in the world, without any charge. The real picture of a $15 or a $25 set in the home of the slums, if you please, receiving the magnificent things in the air, is the picture we must preserve and, I think, can preserve without being altogether altruistic. Moreover, we can do it on a business basis and through a means I have already suggested, publicly, namely, the super-power station.

The super-power station that I picture would be of larger power, greater range and would provide a national program of high quality. A few such super-stations located at suitable points in the country and interconnected by radio itself, would enable all of these units to send out the same program simultaneously. But such a system would no more replace the smaller, more individual broadcasting stations, than the national magazines of large circulation replace the local newspapers. Indeed, the smaller broadcasting stations might supplement the work of the super-stations by automatically and mechanically repeating the national programs sent out by the super-stations so that every city, town, village and hamlet in this country might have the benefits of such a program. On the other hand, these smaller stations could continue to send out their individual programs as at present, when they so desired.

If we get a chain of super-power stations and cover the entire country, then we create an entirely new problem as to the question of copyright music, paying for talent, handling the artist and the like. I think, you will agree, it will be a mark of distinction for an artist to be able to say "Last night I sang in the National Broadcast Station and was heard by the United States." Thousands of people would give all they possess to be permitted to go on the Metropolitan Opera House stage and be heard by a select few thousand. Many more than that would like to go on the stage which gives them the whole nation as a forum. It will bring out possibilities of latent talent residing in those who have never had the opportunity to approach the public.

But if that is impractical, if that should not prove

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to be the desire of budding artists, why, then, suppose we do have to pay for it? That does not frighten me. If we have a National Broadcast Station whose voice reaches over the country, and if we have to pay for the talent, we will do it. If we have to spend $2,000,000 or even more a year in giving the very best and only the best which can be had from that single point, making it possible for everyone in the United States to hear it, an industry of half a billion dollars per year, which I believe the radio industry will reach within the next few years, could support it if the burden were equally and equitably distributed. Suppose the industry taxed itself 2% or 1%, or whatever the percentage might be; that percentage would be more than would be necessary to run a first-class National Entertainment institution, paying more liberally than any theatre or any opera can pay at the present time.

Gentlemen, that is the picture as I see it, and if we live for the next five years, as I hope we shall, we may be talking of that as belonging to the past as well.

Universal Reception

Radio is not yet in every home, but we are doing our best to put it there. Right now we have on the market a two-tube receiving set, with headsets, selling to the public for only $35. The greatest effort has been made by the Radio Corporation to put radio within the reach of remote farmers, tenement dwellers in the cities, the poor even more than the well-to-do. The officials of the Radio Corporation have themselves been poor. They have been farmers' sons, and ship operators, and engineers, and they have kept steadily in mind that radio would not fulfill its function for the people of America unless it brought new light, education and happiness to the remote homes, where families are lonely and the crowded places where families have hitherto been without means of recreation, enjoyment or mental improvement.

Whatever legislation this congress may enact that is in the public interest and that will not hamper the strides that have already been made in this country, as compared with the slow progress of Europe, will therefore be whole-heartedly supported by the Radio Corporation.

Freedom of Speech

I cannot help feeling that not only should the public be left free from the payment of any license fee to the Government or others for the privilege of listening on a broadcast receiver, but that it should also be free from fees or tolls of any kind in the field of broadcasting through space. Furthermore, I believe that the expressions of educators and statesmen should reach them uncensored and uncontrolled. The air belongs to the people. It should be regulated by the will of a majority of the people. Its main highways should be maintained for the main travel. To collect a tax from the radio audience would be a reversion to the days of toll roads and bridges; to the days when schools were not public or free and when public libraries were unknown.

In the same way, the drawing of political, racial or religious lines would be a flareback to the day of intolerance and persecution.

Had there been radio broadcasting in 1858, there might have been no Civil War. The Lincoln-Douglas debates, broadcasted, would have reached the whole nation, and speaking to a larger audience, Lincoln might have achieved his peaceful program.

Broadcasting stations, in my conception, are indeed, the bar at which causes can be pleaded for the verdicts of public opinion. The public is well aware that radio broadcasting is not confined to the influence of the lone speaker in the broadcast studio; that speeches from public halls even now are constantly heard by a million listeners, and that eventually it will be practicable, if Congress is willing, to turn on the debates in the Federal legislative bodies, so that the radio world may form its own impressions of laws and the way they are made.

So powerful an instrument for public good should be kept free from partisan manipulations. America today may justly be proud of the freedom of its press. In no country in the world has this freedom been preserved more steadfastly.

It is the newspapers which have forwarded the movements to expose wrong doing and to establish justice, and it is my hope that the freedom of broadcasting will be maintained in the same American spirit. Not only do I believe that no artificial means should be evolved to restrict or tax the radio listeners, but I believe that the radio audience alone should be the final judge of interest in every radio program.

Let Radio Listeners Decide

The radio audience, while it is the largest audience ever addressed by a single human voice, nevertheless has become one of the most concrete, responsive forces in America. The speaker who is dull or rasping, or unintelligent, is immediately labelled as such by a preponderance of letters and postcards, and even telegrams, which arrive at the broadcasting station the next morning. The speaker who is forceful, brief, honest and instructive is likewise labelled by the preponderance of commendation that comes in the next mail.

I am not so impractical as to argue that the broadcasting station can be the channel for every man's self-expression. I am saying, however, that it is now and should continue to be the policy to regard broadcasting stations primarily as a new entertainment and educational facility for the public as a whole, and as a forum for the expression of leaders of worthy causes. No political, racial, religious, or color lines should be drawn. Under such a liberal policy, it is essential that those who speak to the radio audience should be all the more careful of their own reputation for intelligence, fairness, brevity, and the ability to interest varied humanity.

No longer can they feel that they are talking to any select group of their own followers, thinking as they do. They are, in truth, as I have said, at the

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bar of public opinion. They will be judged by their temperateness and reasonableness, as well as by their intelligence and fervor.

Almost invariably broadcasting directors are selected on the basis of their judgment and their ability to arrange an interesting program. They are called upon to serve no other cause. They are bothered occasionally by the effort of cranks and fanatics who, in the same way, have long bothered the newspapers with their efforts to get something printed.

When the sole test is public interest, there is little difficulty in making decisions. The President of the United States always is a welcome speaker to the radio audience. Any candidate for the presidency of the United States, or other high office, whether he be the candidate of the Republican, Democratic, Progressive, Farmer-Labor, Socialist, Prohibition, or any other lawfully organized party should, by the very fact of his nomination by a considerable group, establish himself as of sufficient group to warrant a hearing.

Roughly I should say that any man worthy of a prominent place in the news of the day—provided that place has not been achieved by crimes or misdemeanor—would probably be welcomed by the radio audience, and the only concern of the busy broadcasting director is to arrange his schedule so that there will not be too much fish, fowl, or good red herring."

New Stock Issue Authorized by Westinghouse Electric and Manufacturing Company

AT a meeting of the Board of Directors of the Westinghouse Electric and Manufacturing Company held recently the directors approved an offering to stockholders of record on March 17, of $17,955,000 par value additional common stock at $52.50 per share payable April 16, 1924.

The board also declared a stock dividend of 10 per cent payable in common stock to stockholders of record May 2, 1924. The new stock offered for subscription will thus share in the stock dividend.

At the meeting the directors also approved a dividend of two per cent, one dollar per share, on the preferred stock of the company for the quarter ending March 31, payable April 15, 1924, to stockholders of record at the close of business March 17, 1924.

A dividend of two per cent, one dollar per share, was also declared on the common stock of the company under the same conditions as outlined for the preferred stock, except that the dividend is payable April 30, 1924.

Printed circulars enbodying full details have been mailed to all stockholders copies of which may be obtained at the Company's office, 165 Broadway, New York City.

General Guy E. Tripp, chairman of the Board of Directors of the Westinghouse Electric and Manufacturing Company, made the following statement:

"The figures available for the ten months ending January 31, 1924, indicate that the volume of business done or sales billed for the fiscal year will probably exceed $150,000,000.

"The Board of Directors believe that the demand for the products of the Company will continue to increase and they have therefore approved plans for additional manufacturing facilities to be provided during the next two years. These plans will require not only further capital expenditures, but also additional working capital which the directors believe should be met by the sale of additional common capital stock.

"The present outstanding capital stock is $89,775,150. The present annual dividend requirements at the rate of 8% per annum are $7,182,012. It is estimated that the net income available for dividends and other purposes for the fiscal year to end March 31, 1924, will be approximately $16,000,000.

'The annual dividend requirements at the present date of 8% per annum on the amount of stock outstanding including the amount offered for subscription and also the amount of the 10% stock dividend above mentioned, will be $9,480,252.

"After applying the proceeds of the sale of the additional stock the net current assets, as of March 31, 1924, will be approximately $125,000,000."

Radio Printing

DURING the voyage of the White Star liner Olympic, which arrived at New York from Southampton on February 28th, a trial was made for the first time on shipboard of transmitting radio messages automatically from sea to London so that they could be printed in the General Post Office without human aid. The experiment was successfully achieved at a speed of 90 words per minute at a distance of 700 miles from the land station at Devizes, the printing of the message in London being perfect.

For Sale

SINCE the death of Thomas J. Dunn on March 31st, 1923, the Dununit transmitting device has not been manufactured. Counselor Jerome J. Dunn, a son of Thomas J. Dunn, is selling out the business and offers for sale the letters patent covering the Dununit and all of the other transmitting devices invented by Mr. Dunn. It will be remembered that T. J. Dunn was the first in the telegraph field to realize the importance of transmitting devices and he associated himself over twenty years ago with the original inventor of the Vibroplex, Horace G. Martin. The patents that are now offered for sale have a life of thirteen years and do not infringe any other transmitting device. For particulars address Dununit, c/o TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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WIRELESS COMMUNICATION IN MINES

In the course of experiments designed to perfect methods for the establishment of wireless communication between persons entombed in mine disaster and rescue workers on the surface, conducted by the Department of the Interior at the experimental coal mine of the Bureau of Mines, near Pittsburgh, Pa., signals have been transmitted obliquely through a distance of 800 feet of rock by the use of the T. P. S., or ground conduction system, developed by the Signal Corps of the army. Signals were also transmitted with little difficulty by using compressed air piping, car rails, and other similar conductors. The intervention of such poor conductors as water, coal and mud, and the substitution of wooden for steel rails, did not interfere with the transmission of signals.

The T. P. S. method of ground telegraphy is a means of communication which requires no wire connection between the sending and receiving stations; but it is different from radio telegraphy in that the transfer of electrical energy from the transmitting to receiving apparatus takes place mainly by conduction, and to a much less extent, induction through the ground, instead of through the air as with radio. The T. P. S. method of signaling is for telegraphy only and cannot be used for voice or speech transmission.

For ordinary use for the guidance of mine rescue parties it would be of the greatest help if entombed surviving men could signal the following information to the rescuers: (1) Number of men entombed and their names; (2) number of men living; (3) position of men—in rooms, entries, stopes, shaft, or behind barricade; and (4) condition of air supply.

The present investigation being conducted by the Bureau of Mines on means of underground communication includes (1) the T. P. S. or ground-conduction methods; (2) induction signalling—both high and low frequencies; (3) line-radio over underground mine power and telephone lines, trolley wires, rails, and through piping for water and compressed air; (4) radio; and (5) electrical geophones and auxiliary equipment.

A practical type of apparatus to be of use to the mining industry should be capable of working distances of from 500 to 3,000 feet or more underground through different strata—coal, ore bodies, etc. It is probable that an apparatus suitable for one geologic condition may not be highly satisfactory for another.

While the T. P. S. apparatus is extremely simple, reliable and fool-proof in its operation, the Bureau of Mines does not consider this method to be a general solution to the underground communication problem because of its being limited to the use of telegraph code. Furthermore, reliable communication by this method can only be established through the earth at distance of from two to four times the distance between ground terminals. The T. P. S. and tests carried out on other untuned audio-frequency ground conduction current methods for signalling indicate that considerable interference, depending upon local mine conditions, will be encountered from stray and leakage currents flowing through the ground. On weak signals the interference may completely "drown out" the T. P. S. signals. On the surface such interference may sometimes be minimized by placing the ground leads at right angles to power lines, etc., but underground the ground terminals can not be placed at right angles to the power and trolley wires. Present data indicate that the most feasible method for eliminating low frequency interference is by employing loosely-coupled tuned high-frequency circuits, such being more successful than low-frequency filter circuits.

For some time the Bureau of Mines has been studying the general subject of underground communication, particularly through rock, ore, or coal. Preliminary radio work was done during the summer of 1922, which, while unsuccessful in indicating any practical method of using wireless waves for underground communications, nevertheless indicated clearly that electromagnetic waves may be made to travel through solid strata. The absorption or loss of intensity with distance is very great for the short wave lengths used in these experiments. Longer wave lengths are known to suffer less absorption, and may possibly be found practically effective under certain conditions. Should a practical system of underground communication be devised, it may be advisable as a safety and mine rescue aid to place signal apparatus, together with other emergency equipment, at convenient strategic points, such as faces of entries, on different levels, etc., within the mine where men would be liable to be trapped in cases of mine explosions, fires, falls of rock, or other disasters.

The Bureau of Mines has advocated that refuge chambers be built in the main sections of mines. After an explosion or during a mine fire men might retreat to these chambers and close themselves in until help arrived. Such chambers should be provided with drinking water, canned food, and compressed air. Small refuge chambers have been provided in some coal mines in the United States, where there have been many explosions during shot-firing time, and these chambers have saved lives. A practical form of communicating apparatus also placed in the chamber would probably be of great help to rescue parties.

Although somewhat costly in initial installation and maintenance, the present mine telephone is giving satisfaction in most mines. In cases of disaster such as explosions, fires, falls of rock, flooding, etc., the telephone is often put out of commission or cannot be reached by the underground workers, and at the time when it is most urgently needed. On this account the mining industry as a whole is interested in any system of communication—"phone" in prefer-

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ence to code—that can be relied upon in an emergency; and many requests have been received by the Bureau of Mines to devise such a system.

The solution of the entire mine communication problem is dependent mainly upon the working out of a practical portable mine apparatus of sufficient sensitivity in receiving and power in transmission to have an effective range. It is well known that signals can be transmitted considerable distances through the earth if sufficient power and a receiving set of sufficient sensitivity be used.

The ideal system for mine-rescue work and general underground communication would be one where voice transmission and reception is possible. This is the ultimate end as a solution; but if such a system is not immediately possible or conveniently portable, then a simpler system is desirable, one where a telegraphic code or prearranged signals may be employed. The transmission of code cannot be considered as a general solution to the problem of underground communication.

A practical type of apparatus for underground communication will have to be simple in operation. The apparatus will have to be safe to use in an explosive gaseous atmosphere. During mine disasters, and especially when barricades are erected, there is a probability of danger from a gas explosion should unsafe electrical apparatus be used.

The apparatus must be moisture and waterproof —that is, it should be unaffected by dampness and continuous standing in wet mines. Practically none of the radio or high-frequency apparatus being sold today for general amateur and broadcast use would be suitable for such work. The condensation of moisture on the surfaces of dielectric and non-waterproofed insulating materials, unprotected windings, condenser end-plates, etc., causes large current leakages. In numerous tests by the Bureau of Mines radio, as well as other high-frequency signal apparatus, which had been left underground for from 2 to 10 hours, became very inefficient.

The apparatus must be durable, rugged, and foolproof, and easy to maintain in good working order. The receiving apparatus should be simple to operate and will probably have to be very sensitive. In practically all types of underground communication, whether by direct ground, induction currents, radio, and to a much less extent line-radio, there is high absorption of the transmitted current. The energy picked up by the receiving apparatus is only an infinitely small part of the energy transmitted, which will require for reliable communication a very sensitive receiving apparatus.

The last and probably most important point to be considered is the weight and shape of the signal apparatus. The weight must be kept low if the apparatus is to be sufficiently portable for underground use. The general shape of case and carrying straps or handles must be such as to allow the apparatus to be readily moved while underground should it be necessary to crawl or keep one hand free.

Western Electric Company

To the Stockholders:

The following report on the business of Western Electric Company, Incorporated, for the year 1923 is respectfully submitted.

Sales

The total sales billed during 1923 were $255,177,000, which compares with 1922 as follows:

	1922	1923
To Bell Telephone Companies	$158,614,000	$185,969,000
To Other Domestic Customers	50,340,000	65,713,000
To International W. E. Co. for Export	1,987,000	3,495,000
	$210,941,000	$255,177,000

Under sales there is included the merchandise not of Western Electric manufacture which the company procures for and furnishes to telephone companies as their purchasing agent and storekeeper.

The sales to the company's subsidiary, the International Western Electric Company, Inc., are for export exclusively.

Sales to other domestic customers represent an increase of 31% and to Bell Telephone Companies an increase of 17% over 1922.

The aggregate is considerably more than was estimated at the beginning of the year and represents the largest volume of business ever reached by the company in any year of its history.

The sales for the past several years have been as follows:

1914	$66,409,000	1919	$135,722,000
1915	63,852,000	1920	206,112,000
1916	106,987,000	1921	189,765,000
1917	150,340,000	1922	210,941,000
1918	145,226,000	1923	255,177,000

Total for ten years—$1,530,531,000.

Earnings

The net earnings for the year after providing for the usual depreciation of plant and for all taxes were as shown in the comptroller's statement appended hereto $10,079,471

Deduct Interest on Borrowings 1,159,958

Balance $8,919,513

Out of which were paid dividends

7% on Preferred Stock	$1,727,572	
$10 per share on Common Stock	5,000,000	6,727,572
Balance carried to Common Stock		$2,191,941

The net earnings as stated above, $10,079,471, were 8.1% on the average capital stock and interest bearing obligations for the year.

The Globe Radio Telegraph and Telephone Company has been organized by the filing of incorporation papers at Wilmington, Delaware. The capital stock will be $100,000.

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Taking the Church Into Homes of the People

THE number of phases of modern life affected by radio broadcasting increases steadily. Take a cross section of life almost anywhere and you will find radio—in sports, in music, education, agriculture, journalism, politics, religion, and, recently, even in a funeral service.

For the first time in history, the whole nation could listen to the last rites of a former chief executive, when services at the entombment of ex-President Woodrow Wilson were broadcast from the Cathedral of Sts. Peter and Paul in Washington. The results on that occasion demonstrated that radio is as well adapted to such a solemn occasion as to cultural and entertainment purposes.

In fact, it is predicted that radio will exert a profound and increasing influence on the religious life of the nation and of the world. The number of churches which broadcast their services regularly in various sections of the country is increasing as clergy and public realize the possibilities in this method of communicating religious teaching, inspiration and comfort.

The Federal Council of the Churches of Christ in America is now considering the extension of radio on a wide scale in its work, both for the benefit of communicants and for the hitherto unchurched. The Vatican, too, according to advices from Rome contemplates utilizing radio on a large scale. Individual churches of various denominations have already shown the practicability and popularity of broadcast services of worship. Conspicuous among them, for example, is the famous St. Thomas church, which is becoming as well-known throughout the country as it is in New York City.

Radio readily lends itself to reverent broadcasting not only of sermons, Bible teaching and prayer, but of the great oratorios and other church music.

While broadcast services are welcomed by millions of people in active life, they are a special boon to the sick, the aged, and the shut-ins in homes and institutions, to whom the solace of church service has hitherto been denied.

There are functions of one sort or another in progress from time to time which thousands do not have the opportunity to enjoy in person. An opera company of caliber will come to town and present works of operatic art, but only the fortunate few who have the time, inclination and wherewithal can share this treat. The unfortunate element, which is by far in the majority, must rely on some other agency to learn about what they would have liked to have heard or seen. The newspaper helps some; word of mouth is another agency of communication, but by far, the most potential of the group is the radio.

By means of the radio, every sense but seeing is satisfied. And so realistic is the service rendered by the radio that in many cases even the "seeing" sense is satisfied in that radio enthusiasts can about visualize the characters in their roles.

But how, for instance, does Westinghouse station WBZ manage to transmit into the air for the benefit of thousands the contributions of a first-class opera company which comes to town for a short engagement, or church services, a baseball game, a chime concert, a snappy vaudeville performance or other bit of entertainment of merit? Must the artists themselves make the trip to the building in which the transmitting apparatus is located or must the company officials arrange to put in a transmitting set wherever an activity worthy of broadcast is in progress?

In order to broadcast from points downtown in Springfield or located in some other place remote from the radio station on the roof of the East Springfield works of the Westinghouse Company, station WBZ uses Western Union telegraph wires, which were found to be admirably suited for such work. This arrangement has been carried out in so many different instances that at the present time six different locations in the city of Springfield have permanent wire connections with the East Springfield radio station.

The buildings which have the above-mentioned permanent wire communication with the transmitting unit at East Springfield number among the finest assembly places in the city and include two lines at the Kimball hotel and single lines at the South Congregational church, the Unity church, Foll's theatre, the municipal Auditorium and bell tower, Court Square theatre and the State theatre.

From each of these locations a pair of wires goes to the Western Union headquarters, where a special board panel is provided on which the lines terminate, and which is also connected by another line to the East Springfield works and radio station. This switchboard panel resembles a telephone switchboard, and by the use of plugs and jacks, any line or lines may be connected to the East Springfield line for broadcasting. In connection with the panel there are provided special transformer and condenser facilities which improve the quality of the speech or music transmitted.

These wire lines must be constructed very carefully, and maintained in absolutely first-class condition, as any imperfection would mar the quality of the broadcasting. The Western Union and Westinghouse engineers have devoted a great deal of time and effort to improving these circuits, even reconstructing whole sections of wire sometimes in order to effect results. One particularly difficult condition to contend with is the inductive noise from near-by circuits working on telegraph or tickers, and the most elaborate arrangements are necessary in order to completely eliminate this undesirable feature.

The wire lines run partly in lead-covered cable under ground, partly in twisted pair construction along buildings or on poles and partly in open wiring along the railroad. Wherever possible the lines have been put in permanent cable construction. In order to

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reach certain parts of the city very complicated and difficult routes must be followed. In one case the co-operation of the Postal Telegraph-Cable Company was secured for allowing the use of the conduit facilities.

The Telegraph and the Typewriter

THE article entitled "Old Times at '187 Broadway,'" printed in the January 16th number, has brought the following from an old cable friend in London, England:

"Your correspondent speaking of typewriters, mentions the 'Caligraph' as being used in New York in 1893. I can beat this as we started using a 'Caligraph' (of ancient memory) in the London office of the Commercial Cable Company early in 1892. We had two sounders rigged up, one on the left and another on the right of the main Duplex cable, as some difficulty was experienced owing to the noise of the typewrtier drowning the sounder. We also had a wheatstone receiver in circuit so that the messages could be checked from the Morse slip. However, in less than six months we were all 'au fait' on the machine and it was unanimously agreed that the introduction of the typewriter was one of the finest improvements ever made in the art of operative telegraphy."

An Injunction Asked For

THE American Telephone and Telegraph Company has asked the federal court for a temporary injunction to prevent station WHN, on top of Loew's State Theatre, New York City, from broadcasting.

The contention is made that the majority of the radiophone stations operating in the United States are using both transmitting and receiving circuits which infringe on the patents held by the American Telephone and Telegrpah Company, and it is understood that if the case against WHN is successful steps will be taken to stop other independent stations from broadcasting. There are now 534 stations broadcasting in this country, and if such action by the American Telephone and Telegraph Company is upheld by the courts, it is said that all but about 40 stations would be closed.

The Late Joseph Fisher

Editor:

Referring to Joe Fisher of Nashville, Tenn., in a former issue. He was a fast sender, but what is more remarkable he received on a register the fastest writing and copied up close and counted the checks. You remember that in the olden days the check was the last thing transmitted. Jimmy Leonard of Louisville, Ky., was a sound reader and he copied with a pen at fifty-three words a minute special. Mr. Fisher never did receive by sound.

E. H. HOGSHEAD.

"Short Cut" to the Highest Degree of Shorthand and Typewriting Efficiency

FOLLOWING closely the announcement in these pages of a new and more simplified course of touch typewriting by Walter H. Candler—former telegrapher, author and originator of the system of high speed telegraphing which bears his name, comes the news of a course of simplified shorthand and touch typewriting by the same author that is as radical in its methods as it is simple in its application, and effective in results.

Differing in every respect from other systems, the most radical difference is found in the fact that there are no heiroglyphics to bewilder and confuse; the student does not have to master the difficult science of phonetic sounds, nor is he required to undergo a long siege of arduous studying to become a proficient stenographer—instead, the course is so arranged that any child who can read and write can learn to take dictation and transcribe the notes without errors at a surprising rate of speed.

An interesting feature of this course and one likely to revolutionize the study of shorthand and typewriting, is that the student does not have to learn anything that was not learned when being taught to read and write. It being merely a different application of an old principle which is both simple and easy.

Another feature is that the student begins to take dictation from the start, making the study of the course both interesting and entertaining.

A still more remarkable feature is that dictation may be taken directly on the typewriter, and by so doing eliminate the strain and nerve-racking task of taking dictation with pen or pencil. Typewritten notes being neater and more uniform makes this feature of the course of unusual value both to employer and stenographer for the reason that greater speed is attainable and the typed notes may be transcribed by any one with a knowledge of this simplified course—ten days or ten years after they are made, something not possible with any other system of shorthand and typewriting. And further, typewritten notes being easier to read, the necessity of having to stop in the middle of a sentence to figure out some confusing sign, and often being compelled to seek out the dictator for confirmation or else run the risk of making a mistake, is entirely eliminated.

This feature is one of the most valuable of the course, and is calculated to open up even greater possibilities in the field of stenography.

In strong contrast to the arduous studying and the time consumed by other methods, it is claimed—and justly so, as every claim is supported by court reporters, expert stenographers and others who are in a position to judge its merits, that any person of average intelligence can, by a study of this course, qualify for a stenographic or secretarial position in less than a third of the time required by any other system.

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Fifty Million Audience is Radio's Latest Feat

RADIO broadcasting's greatest feat was performed March 7th when stations located in San Francisco, Hastings, Neb., East Pittsburgh, Pa., Schenectady, N. Y., New York City and London, England, broadcasted simultaneously the annual alumni dinner given in New York City by the Massachusetts Institute of Technology. Engineers who had been working many months to perfect a radio relay or repeating system between San Francisco and London, a distance of more than 7,000 miles, had the satisfaction of knowing that their efforts had been rewarded by radio waves covering a million and a half square miles and that 50,000,000 people had been estimated as the number of available listeners.

Three American companies, The Westinghouse Electric and Manufacturing Company, the General Electric Company, and the Radio Corporation of America, and one English company, the British Broadcasting Company, participated in making radio history. The stations which broadcast the event were as follows: WJZ, in New York; WGY, in Schenectady, KDKA, at East Pittsburgh; KFXX, at Hastings; KGO, at San Francisco, and the stations under the direction of the British Broadcasting Company, in Great Britain, with 2AC in Manchester as the pick-up station.

Microphones placed in the main ball room of the Waldorf-Astoria Hotel in New York were the starting point in the radio repeating and broadcasting system. It was here that the speakers addressed directly their audience.

Those in the speakers' list included the following: General J. G. Harbord, president of the Radio Corporation of America; Calvert Townley, assistant to president of the Westinghouse Electric and Manufacturing Company; Gerard Swope, president of the General Electric Company; Dr. F. W. Stratton, president of the M. I. T.; Frank A. Vanderlip, and David Sarnoff, vice-president of the Radio Corporation of America, with Ralph H. Howes, president of the Technology Club of New York as toastmaster. Vocal and instrumental selections were furnished by such famous artists as Cecilia Hansen, violinist; Mabel Garrison, soprano, and Mario Chamlee, tenor of the Metropolitan Opera Company.

The microphone on the speakers' table led directly to station WJZ, which transmitted the entertainment on its regular wavelength fo 455 meters. Connected with WJZ's amplifying apparatus by land wire was WGY at Schenectady. WGY transmitted the same program simultaneously with WJZ, on 385 meters; KDKA, the Westinghouse Company's pioneer station at East Pittsburgh, the heart of the relaying system, then intercepted WGY's waves on special receiving apparatus. The received signals were then transmitted from KDKA through two stations of transmitting units, one broadcasing a strongly amplified repeat of the original signal on a 94 meter relay wave and the other on the customary wavelength of 326 meters.

Listeners with the range of KDKA listened on the longer wavelength, while the shorter wavelength serviced the Westinghouse repeating station at Hastings, Neb., and station 2AC, of the Metropolitan Vickers Company at Manchester, England. In England, the Metropolitan-Vickers station was linked with its seven sister stations and immediately the KDKA was picked up, these stations repeated the concert simultaneously all over Great Britain.

Hastings, too, broadcasted the same signal but also relayed it to KGO in San Francisco, which last station also picked up the broadcasted waves and repeated them on a different wave length than the one on which they were picked up.

All this was accomplished with the speed of light, as quickly in fact, that the voice of the speaker reached the ears of the British broadcast listeners before it was heard by the audience in the Waldorf-Astoria auditorium. This fact is peculiarly true because sound waves travel much more slowly than do radio waves.

The program of the M. I. T. Alumni Dinner thus reached a greater number of people than any addresses or musical program in the world's history. Starting promptly at 10.30 o'clock the program lasted almost until midnight.

Before it was over, telegrams and telephone calls started to arrive at the various stations. Telegraph cables from England were also received in America telling of the success of the broadcasting.

Frank Conrad, assistant chief engineer of the Westinghouse Company, the only man in the world who foresaw the advantage of short wave broadcasting and who perfected the apparatus necessary for their use, was an enthusiastic listener in Pittsburgh. He had the pleasure of listening to the radio relaying feat which had vindicated his past year and one-half of research work in the short wave field.

H. P. Davis, vice-president of the Westinghouse Company, the "Father of Broadcasting," also saw in the repeating a realization of his prophecy made two years ago regarding the ultimate in radio broadcasting, namely, a few powerful stations of the country servicing numerous small repeating stations.

Nine hours difference in time separated the people of San Francisco and those in the British Isles, but both heard the concert and addresses simultaneously. Though it was 10.30 Central Standard time when the toastmaster introduced the first speaker in New York, the radio fan hearing the addresses in San Francisco listened in at 8.30 P. M. Pacific time, just after his dinner, while the British listener heard the addresses in the "Wee small hours" or at 3.30 A. M. Greenwich noon time.

Limit Liability of Telegraph Companies

LIABILITY limitations fixed by telegraph companies in the transmission of messages were on March 9th sustained by the supreme court of the United States.

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Radio Broadcasts Talks 7,000 Miles Without Wire's Aid

WHAT was hailed as the greatest achievement in relaying radio broadcasting was staged on March 7, at the dinner of the Massachusetts Institute of Technology, held in the Waldorf-Astoria, New York City, when six stations, spanning 7,000 miles, broadcast simultaneously speeches and a musical program.

The test brought into use an invention perfected by Frank Conrad, assistant chief engineer of the Westinghouse Electric and Manufacturing Company at Pittsburgh, which eliminated the use of telephone wires for the transmission of the music and words and put the complete program entirely into the air. According to the radio officials in charge of the experiment, the broadcasting reached a radio population of 50,000,000 persons.

Working in on the task of distributing the program were stations located in San Francisco, Hastings, Neb., East Pittsburgh, Schenectady, New York and London, England. It was estimated that the radio waves shot out from these stations covered 1,500,000 square miles.

Participating in the demonstration were three American and one British company. The American companies were the Westinghouse Electric and Manufacturing Co., the General Electric Company and the Radio Corporation of America. The British company was the British Broadcasting Company. The stations operating were WJZ in New York; WGY in Schenectady; KDKA at East Pittsburgh; KFKX at Hastings, Neb.; KGO at San Francisco. The stations under the direction of the British Broadcasting Company in Great Britain used Station 2AC in Manchester as the pick-up unit.

The microphones on the speakers' table led directly to Station WJZ, which transmitted the entertainment on its regular wave length of 455 meters. Connected with WJZ's amplifying apparatus was WGY at Schenectady. WGY transmitted the program simultaneously with WJZ on 385 meters.

KDKA, the Westinghouse's pioneer station at East Pittsburgh, the heart of the relaying system, then intercepted WGY's waves on special receiving apparatus. The received signals were transmitted through two stations or transmitting units, one broadcasting a strongly amplified repetition of the original signal on a 94-meter relay wave and the other unit broadcasting on the customary wave length of 326 meters.

Listeners with the range of KDKA then listened on the longer wave length, while the shorter wave length serviced the Westinghouse repeating station at Hastings, Neb., and Station 2AC of the Metropolitan-Vickers Company at Manchester, Eng.

In England, the Metropolitan-Vickers station was linked with its seven sister stations, and immediately KDKA was picked up repeated the program simultaneously all over Great Britain.

Hastings, Neb., too, was scheduled to broadcast the same signal, but also relayed it to Station KGO in San Francisco, which station also picked up the broadcast waves and repeated them on a different wave length than the one on which they were picked up.

Greenwich Time

IN connection with the inauguration of the system by which the time signals distributed by the British Broadcasting Company will be transmitted direct from Greenwich Observatory to the possessors of wireless telephonic receivers, Sir Frank Dyson, the Astronomer Royal, gave an address, which was broadcast from the company's London station recently, on the history of time distribution and why Greenwich time has become the world-wide standard.

Solar time, such as was shown on a sun-dial, he said, was not quite uniform from day to day. Astronomers had made allowance for this, and devised a uniform time, which, on the average, agreed with true solar time, but at certain times of the year might differ from it by as much as a quarter of an hour. This was called mean solar time. The time now kept in Great Britain was the mean solar time of Greenwich and was called Greenwich mean time. But the mean solar time of any other place differed from that of Greenwich by an amount depending on its longitude. A hundred years ago, at places where clocks were kept at all accurately, they were generally set to show local mean time. It was not until 1880 that the Definition of Time Act was passed, making Greenwich time the legal time for Great Britain and Dublin time for Ireland. The Act was modified as regards Ireland in 1916.

After uniformity had been reached in different countries, there remained the inconvenience arising from the change of time in passing from one country to another, and in passing through a large extent of territory such as Canada or the United States. The fundamental ideal of the scheme now generally adopted was that standard meridians should be established 15° apart in longitude. At every place the time to be adopted was that of the nearest standard meridian, and the question arose as to what should be taken as the prime meridian. The Greenwich Observatory was originally founded to provide navigators with the data necessary for the determination of longitude at sea. It came about that sea-charts universally employed the Greenwich meridian. The lines of longitude marked on them were figured as so many degrees East or West of Greenwich. It was also very generally employed in land maps, and so the adoption of Greenwich as prime meridian was agreed to by most countries. At the present time the use of this so-called zone time was nearly universal, though there were partial exceptions in India, New Zealand, and South Australia, where a time differing exactly half-an-hour from that of the nearest standard meridian was employed.

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ANNUAL REPORT FOR 1923 OF THE RADIO CORPORATION OF AMERICA

THE great strides made by radio in the past twelve months and its rise to a leading national industry, are reflected in the annual report of the Radio Corporation of America for 1923, made public today. The report shows a total of $26,394,789 in gross income for 1923, as against $14,830,856 for 1922. Its net income for period of 1923 is given as $4,737,774, as compared with $2,974,579 for 1922 and $426,799 for 1921.

DIVIDEND ON PREFERRED STOCK

The Corporation's capital stock consists of 3,955,974 shares of 7 per cent preferred stock of $5.00 par value, and 5,777,000 shares of common stock of no par value against which later there is shown on the balance sheet an equity of $15,411,182, which is approximately $2.67 per share.

The 7 per cent dividend on the preferred stock became cumulative January 1, 1924 (amounting to $1,384,591), which amount has been set aside as a reserve out of the net income for the year of $4,737,774.

The Corporation's financial position has been further strengthened during 1923. Current assets have increased $3,531,791 and exceed current liabilities by $8,000,467.

OUTSTANDING DEVELOPMENTS OF THE YEAR

Two additional radio communication circuits were opened for commercial service during the year, the report declares. These connect the United States with Italy and Poland, making in all nine channels of international message traffic. Nine radio circuits are now in operation to Great Britain, Norway, Germany, France, Italy, Poland, Japan, Hawaii, and Hawaii to Japan. "The service thus rendered to American business interests and the enterprise of the Corporations in developing new international radio connections," the report continues, "means much in developing foreign trade and in preserving friendly relations with other nations." Plans for high-powered trans-oceanic stations in Brazil have been approved. Service to the Argentine, on a deferred rate basis, through the medium of the high-power station at Buenos Aires, was inaugurated in February of the present year.

The exchange of traffic with the Republic of China is expected to prove profitable according to the report and will serve to foster trade between that country and the United States. Preliminary surveys for the erection of stations in China has already begun. In this enterprise the Federal Telegraph Company of California invited the participation of the Radio Corporation and the Federal Telegraph Company of Delaware was formed.

"Since its inauguration, the Radio Corporation has been the pioneer in moderate rates for Trans-Atlantic messages. From the pressure of our competition undoubtedly resulted the reduction in rates to Great Britain and France, which was announced by the cable companies in April, 1923. Their rates were reduced to agree with those already maintained by us and similar reduction was soon made to other European points. The subsequent operation of our Trans-Atlantic circuits indicates that competition with the cables on even terms is being successfully met," says the report. The report points out that by a re-arrangement of the Central Radio Office in New York, it is now possible to handle over-seas message traffic by twelve distinct circuits.

"The great value of radio communication over other methods in emergencies," says the report, "has been demonstrated on various occasions." During five days in March, when severe storms interrupted the land lines to the Pacific Coast, we assisted the news associations and successfully handled a large volume of press matter between New York and San Francisco.

"In October, during the World's Series baseball games in New York, wires to San Francisco were again interrupted and, for the first time, a baseball game was described play by play, by radio from New York to San Francisco. During the Japanese disaster in September, uninterrupted radio communication was maintained with the stricken empire and the worry of an anxious world was allayed by our service."

Gross income from trans-oceanic communication is given as $3,191,558.

MARINE RADIO COMMUNICATION

The Radio Corporation operates marine coastal stations which communicate with ships at sea. These stations are now located at: Chatham, Mass.; New York, N. Y.; Cape May, N. J.; San Francisco, Cal.; Los Angeles, Cal.

"Our radio service between ships and shore has undergone considerable change during the year," says the report. "Improved types of apparatus have enabled us to permanently close our coastal stations at New London, Conn., and Siasconset, Mass. The service formerly rendered by them is now performed with greater efficiency by the Chatham, Mass., station. The closing of the stations mentioned is pursuant to our policy of eliminating interference with radio broadcast programs, caused by marine spark transmitting apparatus, by using only continuous wave tube transmitters in shore to ship service."

"The traffic through our coastal stations in 1923 was 36 per cent greater than in 1922," says the report.

"The free medical service made available on ships at sea through measures inaugurated by your officers in co-operation with the U. S. Public Health Service, and the Seamen's Church Institute of New York has rendered urgent emergency aid on many occasions during the year," the report continues. Approximately 75 passenger vessels are now regular subscribers to the nightly press service which the RCA maintains through their coastal stations."

At the beginning of the year the Corporation fur-

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nished radio apparatus on a rental and service basis to 705 ships. By the close of the year these had increased to 759. "A feature of the year's activity," says the report, "was a contract for furnishing the S.S. Leviathan with radio equipment, and its operation by your Corporation."

The gross income from rentals, sales, service fees and ship tolls on message traffic during 1923 from the Marine Division, was $738,140.

SALES

The report speaks of the phenomenal growth of broadcasting and of public interest therein and adds:

"During the year 1923 about 450 radio broadcasting stations have been in operation in the United States. The development of non-radiating receiving apparatus of greater selectivity will make this great number of stations a real asset to the radio broadcast listener, pending the time when natural evolution of the art may bring fewer stations more efficiently distributed and of better grade and higher power."

Distribution of Radio Corporation products is accomplished through 116 distributors with 57 branches, making 173 wholesale outlet points. Many thousands of retail dealers serve as a link between these large distributors and the consumer.

"There are still many problems to be solved in the broadcasting situation," the report says, "and your engineers are devoting themselves to their solution with the ambition of perfecting the service to the satisfaction and benefit of the American public."

Gross sales of radio receiving apparatus amounted to $22,465,090.

FINANCIAL

"The current liabilities amounting to $4,218,231 represent indebtedness for merchandise, materials and Federal Income Tax. The Corporation has no bonded debt or notes outstanding.

"The total of plant and equipment stands at $12,373,177, and the reserve for depreciation and obsolescence of plant amounts to $1,575,242. The amortization of patents reserve, after charging patents expired, now stands at $2,912,836, and represents the depreciation to December 31, 1923, indicated by the schedule founded on the life of such patents."

OPERATIONS

"After providing for depreciation of plant and inventory, the operations for the year resulted in a net profit of $4,737,774. Of this $1,709,265 has been allocated to reserves for patents, federal income tax and organization expense, and $1,384,591 for preferred stock dividends the balance of $1,643,918 having been credited to surplus account.

"The gross revenue from trans-oceanic service showed an increase of 9.5 per cent; marine service an increase of 17 per cent, and sales an increase of 99.9 per cent over the relative totals for the previous year."

GENERAL

The report states that the Radio Corporation has recently been made the object of a complaint by the Federal Trade Commission and adds, "The position of the Corporation, with regard to this, has been that it welcomes the opportunity to make a complete review of its history, organization and policies to that body." The directors of the Radio Corporation are confident that when the investigation is fully completed and finally considered, the position of the Corporation will be found to be entirely sound and proper, according to the report.

Edward J. Nally, managing director of foreign relations, will return to Europe on April 2nd on the steamship Paris, after a brief visit to his New York office.

GENERAL J. G. HARBORD, *president,* made a trip of inspection recently to the General Electric Company's plant at Schenectady, N. Y.

David Sarnoff, vice-president and general manager, appeared at a hearing on the White radio bill before the House Merchant Marine and Fisheries Committee at Washington recently and strongly advocated the Radio Corporation's policy of the "freedom of the air." Mr. Sarnoff favored regulation and said the freedom of broadcasting should be preserved.

Breaks World's Radio Speed Record

THE world's speed record for copying of radio telegraph code signals was shattered when A. E. Gerhard received straight copy at the astounding speed of 59½ words per minute, at a contest held at the Fourth Annual Convention of the Second District Executive Radio Council at the Pennsylvania Hotel, New York, on March 7th.

Mr. Gerhard is an operator in the employ of the Radio Corporation of America, and his remarkable feat of raising the former world's record of 56 words per minute has given him the plaudits of the entire radio world.

What a remarkable accomplishment this is can best be appreciated, perhaps, when one figures that his record is three times as fast as the usual speed used in ship radio communication.

All America Cables

C. B. LAWRENCE, superintendent of the South American land lines, left on an inspection trip in Chile and Bolivia.

Manager J. O. Wiseman of Salina Cruz, Mexico, will proceed to Santa Elena, Ecuador, to relieve Manager J. F. Whaley of that station who goes on furlough.

Manager J. F. Scheridan of Rio de Janeiro, Brazil, left that station on furlough to be spent in the United States.

Commercial Agent H. W. Hamilton of Buenos Aires, Arg., left for furlough in the United States.

Powerful Wireless Station

A POWERFUL wireless station, costing $2,000,000, is to be erected at Vancouver, Canada, which will be in direct communication with London and Australia. The new station will be capable of receiving at high speed from 200 to 300 words a minute.

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"Coal Oil Johnny" and Oil

By R. W. Ledwith

The writer has a corn cob pipe and sometimes, not always, a pouch full of good smoking tobacco. There are few factors so potent in reviving a fading memory. The combination induces reflections, paints pictures of men and incidents and stimulates mentality.

Add to this the presence of an old-time friend who also enjoys the pipe and has passed, in part at least, along the byways and later the highways with one. Fine combination indeed!

"Do you recall the early days in the Pennsylvania oil regions?" queries the friend. One smiles as the mental figures assume shape. Early days in the Pennsylvania oil regions! Well, I guess yes. We had no Teapot Dome in those days but we did have a Johnny Steel, "Coal Oil Johnny," more famous in his days than anyone so far discovered by the various Washington investigations. Johnny, like Topsy, just grew up on what was known as Tarr Farm, a buckwheat farm about midway between Oil City and Titusville. And Tarr Farm when the writer appeared there for the Pacific and Atlantic Telegraph Company was the leading producing center of the region. Then there was Columbia Center, a few miles away, as tough as any frontier town known to the map of '49. And a little farther up the creek was Titusville, always pretentious and more than half way civilized.

Tarr Farm like other region towns enjoyed the novelty of being a "moving town," could be carted away if the wells suddenly adopted prohibition. In Chicago today they have portable school houses. In Tarr Farm they were called "portable shacks." The writer contributed $10 per week for the privilege of sleeping at night with another adventurer in a bed that during the day was occupied by two prospectors. Talk of excessive prices for eats today! In those days one was in rare luck to get a square meal at any price.

It was under these conditions that "Coal Oil John," the adopted son of James Tarr, emerged from a farm boy into a millionaire over night. Instead of harvesting buckwheat he engaged in a strenuous campaign of marketing dollars and cents. And he succeeded! There has been as many stories printed about him as he possessed pennies and more or less many were true. He bought a hotel in Philadelphia one day because he was peeved about something and presented it the next day to the former proprietor; he broke barroom mirrors for amusement, purchased a New York theatre for a butterfly actress of a few days' acquaintance, ad infinitum.

In a brief period the scenes shifted and John returned to the region, not to the "old home town" but to Rouseville, a nearby town, as the baggage agent of the Oil Creek and Allegheny River railroad. He had traveled meteor-like the great white way, had observed and was observed and singular as such things go, he returned wild mild, even modest regrets. Nor was he disposed to boast of his conquests or exploits. He started life anew and as testified by those who know best, met his modest railroad responsibilities uncomplainingly.

Personally as farm boy and millionaire he had many manly qualities, other writers to the contrary notwithstanding. His explosive moments, his astounding exploits and dissipation of all sorts and kind in large part had their origin in the consumption of the Indians' "fire water."

Such in part was Tarr Farm, such life in the early days of the Pennsylvania oil regions, then the greatest known oil producing center in the world. The mining camps of the far west, the gold fever of the '49ers in California or in later years those of Alaska had nothing on the Pennsylvania regions in the variety of animated humanity. Every nationality, every creed and color and costume were represented and all, the telegraph operator excepted, impelled by the one consuming motive—the acquisition of wealth.

The same fatal fever characterizes the average American today. What will the harvest be?

Wireless Reception on Trains

It is reported that following the recent G. W. R. tests, Pullman cars on the L. N. E., L. M. & S., and Southern Railways are to be fitted with radio receiving sets. The Great Western demonstration was arranged by Colin H. Gardner, managing director of the Midland Radio Telephone Manufacturers Stourbridge, and Midlands organizers of the Radio Society of Great Britain. The experiments were conducted by means of a "Mellowtone" set employing two high-frequency, one detector, one note-magnifier, and two power-amplifying valves—an exact replica of the sets made commercially by the Midland Radio Telephone Manufacturers. An aerial of the twin wire type, using 50 feet of rubber-covered "flex," was suspended about a foot below the roof of the brake van, and the earth wire was carried to the vacuum brake and thence through the wheels to the rails. Singularly little trouble was experienced from the generator hum of the train lighting apparatus, nor did the slight rocking of the train when traveling at high speed affect the tuning of the set. The success has been such that the installing of a permanent set on the Cornish-Riviera express is now contemplated.—*London Electrical Review.*

Machine Telegraphs 400 Words a Minute

An invention to send 400 words a minute by telegraph has just been perfected, it is said, by a Swedish expert, Lieut. Thor Thoernblad, who is now seeking patent rights.

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EDITORIAL COMMENT

Wireless on the Train

TELEPHONE subscribers are now able to ring up and get into conversation with passengers on express trains in Germany.

The Huth Company, of Berlin, is responsible for this latest wonder. By means of an aerial laid along the tops of the coaches of a train, messages transmitted along telegraph wires to a local wireless station can be picked up and received by the passenger for whom they are intended. In the same manner any traveller can make use of the train's wireless to ring up a telephone exchange.

The procedure is much the same as at a stationary exchange. The subscriber first rings his exchange and gives the traveller's number, when the exchange operator puts him through to a railway wireless station.

On receipt of the signal the train's wireless operator also calls up the wireless station and the passenger and subscriber then speak direct to each other by means of the inter-connected land and wireless telephones.

Why Telegrams Never Arrive

THE telegraph, that frail link with the outer world, is in its way a curiosity in Central Africa. It works very irregularly because of the double function of the copper wire in spreading news and as the material out of which the natives make their ornaments.

Copper is very highly appreciated. When a family considers that it requires more armbands, necklaces, leg rings, or is otherwise seized by an irresistible desire to gratify its vanity, the members simply go and cut down the wire between two poles and thus obtain for nothing material which otherwise costs large sums at the nearest Indian "duka" (shop), of course, always assuming that they are not caught red-handed by some guard.

In this way each negro becomes a walking telegraph pole. The line is thus in the widest sense of the word the jeweler's shop of the district and under these circumstances one cannot wonder if the wires go wrong and telegrams never arrive.

The people of the province are called Ba-kiga (ba—several, mu—one). They are broad shouldered, with very dark-colored skins. The hair is often plaited in a lot of little curls, at the ends of which hang dazzling white cowrie shells. When they toss their heads about in dancing, these hair ornaments form a moving halo around their black heads.

Further, there are some Bahororos with shaved heads, of which a sort of cockscomb of hair has been left in order to improve their appearance.

Device Aids Telegraphy

A GERMAN scientist claims to have discovered a nonmagnetic force which causes attraction between metals that will be of immense value in telegraphy and telephony.

West Indies

A TREASURY memorandum has been presented to the English Parliament, giving details of the expenditure proposed to be incurred for the extension of telegraphic facilities in the West Indies. A bill is to be introduced providing for the issue from the Consolidated Fund of a sum not exceeding £400,000 for the construction of a new submarine cable from the Turks Islands, where it will join the existing cables of the Direct West India Cable Company to Barbados, and for the provision of telegraphic communication either by submarine cable or by wireless stations between Barbados, Dominica, Saint Lucia, Saint Vincent, and Grenada.

The amount advanced will be repaid by an annuity for a term not exceeding thirty years, and so far as the annuity has to be met out of votes contributions towards the payment thereof will be received from the Government of Canada and the other Colonial Governments concerned. The maximum ultimate liability of the Exchequer in respect of the capital cost is estimated at £7,914 17s 7d for thirty years. But it is anticipated that receipts will normally exceed expenses other than the annuity by about £8,000, and the actual charge on the Exchequer is therefore not likely to exceed £5,500 a year. Against this there will be a saving of £8,000 a year, as the subsidy now paid to the West India and Panama Telegraph Company will cease.

A £400,000 contract for the erection of seven high powered wireless stations to connect up the islands in the West Indies has recently been given by the British Government to the Radio Communication Company, London.

Ask Telegraph Firm Receiver

AN application for an injunction and the appointment of a receiver was filed in the circuit court in Independence, against the Dean Automatic Telegraph Company, a Delaware company with principal offices in Kansas City, at 422 East Tenth Street.

The plaintiffs were Paul Hess, Albert Pico, Jeanette Cooper and D. Mackintosh.

Officers and stockholders of the company were named, as well as the Peoples' Trust Company, the American Trading and Securities Company and the Myers-Gordon Investment Company.

The plaintiffs allege they are stockholders in the company, and that the company has capital stock of 10 million dollars, but the tangible assets are only about $10,000. The automatic telegraph invention, they allege, is the invention of the late Robert L. Dean, who turned the property over to the company August 12, 1918. The plaintiffs say there has been no meeting of stockholders since 1920, and the company has placed the handling of stock in the hands of other companies.

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Hawkin's Electrical Guide contains ten wonderfully helpful and practical volumes, written in clear, concise language, easy to understand, no wasted words, full up-to-the-minute electrical knowledge, which can be applied to problems that come up from day to day. You can carry a number of the books with you until you have mastered the subjects. All subjects are indexed so that you can find the information instantly. Written in the modern question and answer form. It's like having an electrical authority always at your elbow ready to answer any question you ask. 4700 pictures, 3500 pages, pocket size, flexible cover; price $10.00 for the full set of ten books. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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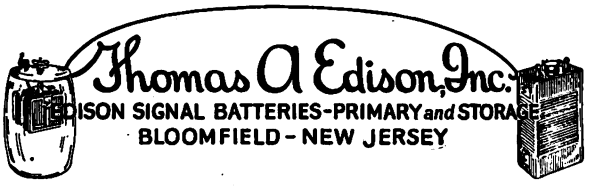
Its reliability has been established over thirty years of continuous use by Railroads as the standard service of energy for the operation of automatic signals.



ST. LOUIS Railway Exchange Bldg. CHICAGO Peoples Gas Bldg. SAN FRANCISCO Balboa Bldg. 2010-36

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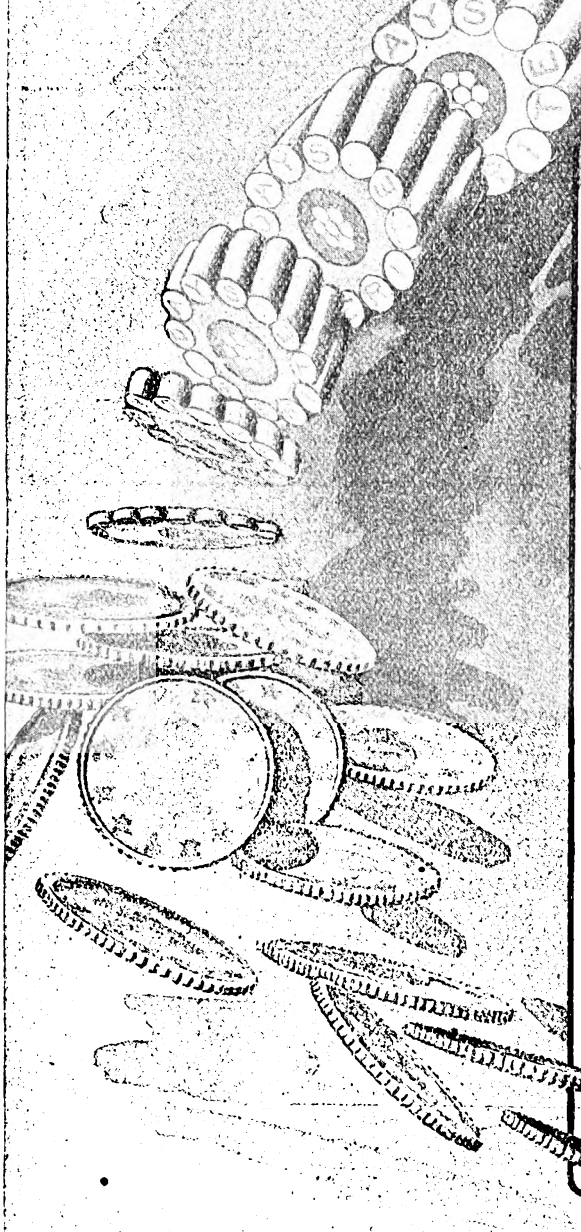

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

Committee No. 12—Radio and Wire Carrier System held a meeting in New York on March 25th.

Committee No. 11 — Telegraph and Telephone Transmission will hold a meeting in New York on April 8th and 9th. B. F. Thompson, chairman, Baltimore, Md.; C. E. Baxter, Detroit, Mich.; E. V. Adams, New York; C. D. Briggs, New Haven, Conn.; W. H. Capen, New York; J. H. Ditch, Philadelphia; S. L. Elliot, Montreal, Que.; F. S. Foland, New York, and H. W. Drake, New York.

Committee No. 4—Electrical Protection will hold a meeting in New York City on April 22nd and 23rd. J. F. Caskey, chairman, Bethlehem, Pa.; L. Behner, Pittsburgh, Pa.; W. L. Cook, Chicago; W. M. Gould, New York; G. H. Mayer, Stevens Point, Wis.; P. Norton, New York; P. A. Rady, Philadelphia, and H. W. Drake, New York.

Committee No. 6—Message Traffic held a meeting in St. Louis, Mo., on March 12th and 13th.

Committee No. 10—Education and Training of Telegraph and Telephone Employees held a meeting in St. Louis on March 14th.

The printed proceedings of the Telegraph and Telephone Section of the American Railway Association covering the meeting at Colorado Springs, Colo., September, 1923, are now being printed and will be distributed in a few days. The work has been produced under the direction of the secretary, W. A. Fairbanks. There are 806 pages to the book. From this it will be judged that it is a work of great importance to the railroad telegraph people.

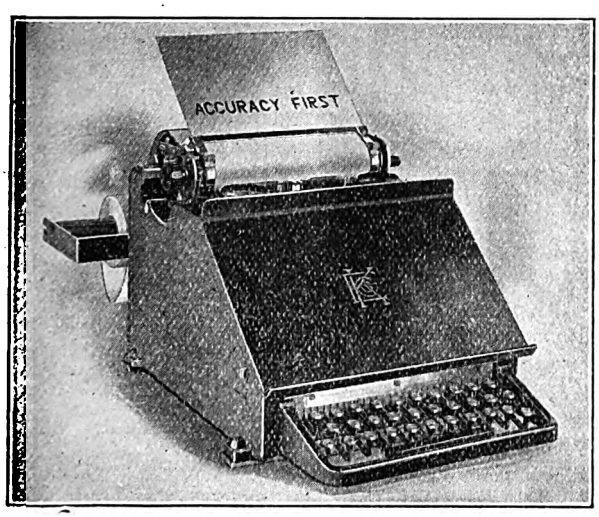
A meeting of Committee No. 7—Inductive Interference—will be held at 30 Vesey Street, New York City, on April 15, 16 and 17, 1924. The first day's session will convene at 10.00 A. M.

A MEETING of the Special Committee on Rules for Committee Work of the Telegraph and Telephone Section will be held at 30 Vesey Street, New York City, on April 18.

Radio Broadcasting Station

POSSIBILITY of operating a radio broadcasting station at Philadelphia by the Pennsylvania Railroad for communicating with other divisions in emergency, which was discussed by railroad officials as a result of recent storms, has been abandoned, at least for the time. It was found that the federal radio bill passed in 1912 prohibits the operation of a commercial broadcasting station of a stronger power than 500 watts within five miles of a government station.

In the meantime the railroad has made arrangements with amateur members of the American Radio Relay League to send railroad messages in emergency.



"SAY IT TO THE OTHER END IN WRITING."

Four Telegraph Typewriters enable one Railroad to move freight cars twenty-four hours earlier than before the installation was made.

These typewriters are in series on a way wire connecting freight yards, piers and general offices. Motor generators are eliminated by equipping the alternating current points with A. C. motors. All relays are eliminated and although the typewriters are connected electrically like main line sounders, no adjusting is necessary during wet weather conditions.

The machines are used continuously. During the day the messages and waybills are taken from the machines as they are received. At night the receiving clerks go home but the machines stay "on the job to take the message." All night long they receive without human aid.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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Death of P. W. Drew

OUR readers will regret to learn of the announcement on March 25th of the death of P. W. Drew at Los Angeles, Calif., where he had gone to spend the winter months. He was for over thirty-five years secretary of the Association of Railway Telegraph Superintendents, and since his retirement from that office in 1916, he had lived in Chicago. Mr. Drew was well known to every railroad telegraph official in the country and his death will be a great shock to them.

He was born in Burlington, Vt. on July 8th, 1843, and entered the telegraph service in 1862. He held various positions on railroads in the West until his duties as secretary of the Association of Railway Telegraph Superintendents demanded almost his entire attention. He was a constant attendant at the annual gatherings of the Railway Association, as well as at the reunions of the Old Time Telegraphers' and Historical Association, of which he was a member. Mrs. Drew accompanied her husband on all these outings. Mr. Drew is survived by his wife and several children. The funeral services took place at the home of his son at Evanston, Ill. on March 31st.

Pacific Cable Record

A RECORD volume of traffic was handled by the Pacific cable in the year ended March 31, 1923. In their annual report the board state that nearly 10,000,000 paying words of international traffic (that is, traffic other than local traffic between Australia, New Zealand, and the Pacific Islands) were transmitted across the system. This was approximately 1,300,000 words in excess of the total during the previous year, and was the largest volume of traffic handled in one year, exceeding by over 900,000 words the previous record of 1919-1920. The ordinary or full rate international traffic showed an increase of approximately 100,000 words, the deferred ordinary approximately 275,000 words, and the week-end telegrams an increase of approximately 1,255,000 words. On the other hand, there was a decrease of approximately 200,000 words of Government traffic, and of approximately 137,000 words of Press traffic.

Week-end telegrams represented no less than 35 per cent of the total international traffic for the year. This traffic increases in popularity. Unfortunately, owing to its volume and to the limitation of capacity for its transmission, there are occasions when messages of this class are delayed several days in transmission. In addition to the international traffic, approximately 2,000,000 paying words were carried between Australia and New Zealand, and between those Dominions and the Pacific Islands. This was approximately 150,000 words less than during the previous year.

Receipts for the twelve months exceeded the ordinary expenses by £256,298. In view of the question of the duplication of the northern cables, the board are of opinion that the whole of the surplus receipts, namely £169,603, should be employed to strengthen the reserve and renewal fund, the resources of which are not yet adequate for the purpose. Excluding special appropriations, the expenditure was less than in the preceding year by £45,242. The total, assets of the reserve and renewal fund amounted, at March 31, to £1,977,363. For the current financial year it was estimated that traffic revenue would amount to £450,000, working expenses to £248,500, and renewal fund contribution to £39,150, leaving a surplus of £162,350. The revenue for the six months ended September 30, was substantially in advance of the proportionate part of the estimate, and unless trade conditions cause a substantial diminution of the volume of cable traffic, or the long northern cables suffer interruption, it is anticipated that the estimate will be exceeded.

It is stated that when the duplication of the cable system south of Fiji, now in progress, has been completed, the facilities for the distribution of traffic will be so flexible that the interruption of any of the three cables at Norfolk Island will no longer cause any suspension of service or even serious dislocation. Delays will be minimized, and in particular the local traffic between Australia and New Zealand will benefit considerably. Arrangements were made during the year under review for the despatch of a small expedition to Vancouver Island and to Fiji to carry out investigations as regards the possibilities in those localities for wireless stations, in case it might be found expedient in the future to instal wireless.

Prominent Engineers on Radio Committee

PRESIDENT J. H. MORECROFT, of the Institute of Radio Engineers, has appointed the following as members of the Standardization Committee of the Institute for the year 1924-25: E. H. Armstrong, L. A. Hazeltine, A. N. Goldsmith, J. V. L. Hogan, J. H. Dellinger, C. A. Hoxie, A. E. Reoch, L. W. Chubb, H. W. Nichols, F. H. Kroger, R. F. Gowen, L. E. Whittemore, Bowden Washington and Capt. Guy Hill. Donald McNicol is chairman of the committee.

A book of definitions of radio engineering terms was published by the Institute in 1922 and the duty of the new committee is to bring this important work up to date in view of the many forward steps which have been made in the art of radio during the past few years.

"Standardization"

THE American Engineering Standards Committee has just issued a small but interesting book entitled "Standardization—What It Is Doing for Industry." This describes how standardization is being carried on, first in the individual plant, second in industry as a whole, third nationally on an inter-industrial basis, fourth and last, internationally.

This book can be procured by writing to the office of the American Engineering Standards Committee, 29 West 39th Street, New York City.

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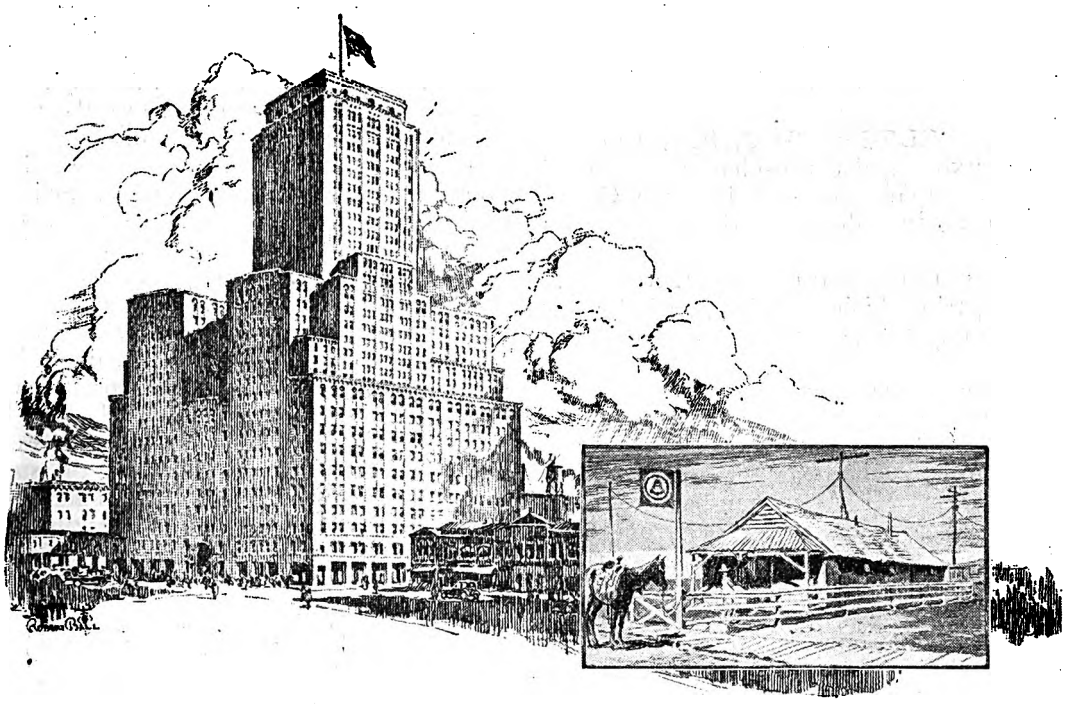

Each Serves Its Community

In Fraser, Colorado, a log cabin of three rooms shelters a telephone exchange that connects with the mountain homes of cowmen, miners, homesteaders and tie-cutters. In the heart of New York City a new building of twenty-nine stories is to become the home of several metropolitan central offices serving some 120,000 telephones. This building will contain, as well, offices for executives and for engineering, commercial, plant and accounting forces, providing space for over 7000 telephone workers.

Each of these buildings helps to render adequate and economical telephone service in its own community. They stand at the extremes in size, equipment and personnel. Yet they both indicate the nation-wide need for adequate housing of the activities of the Bell System; and they illustrate the varied ways in which that need is being met. One of the largest single items of plant investment of the Bell System is real estate, comprising nearly 1700 buildings acquired, with their sites, at a cost of $180,000,000.

It is continuously the aim of the Bell System to construct and so to situate each new building—whether executive office, central office, storehouse or garage—so that it shall serve its community with the utmost efficiency and economy, and remain a sound investment throughout its period of life.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

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PERSONAL

A. E. CHANDLER, son of the late A. B. Chandler, president of the Postal-Telegraph Cable Company, Randolph, Vt., was in New York last week on business connected with his hotel project.

POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice president and general manager, delivered an address before the Chamber of Commerce members at Altoona, Pa., on March 14th.

T. N. Powers, assistant traffic manager, has returned from a trip which included the following offices: Albany, Troy, Buffalo, Cleveland and Chicago.

John J. Coogan, manager, Newark, N. J. and A. C. Ackerman, manager, Jersey City, N. J. are on the sick list. Mr. Coogan has been succeeded by J. H. Hoffman, who was for several years cashier at Newark. Mr. Ackerman has been succeeded by R. H. Mason, transferred from New Brunswick, N. J. O. C. Crist, formerly operator succeeds Mr. Mason.

The Company has recently returned to its old location at Meriden, Conn., where a new up-to-date building has been erected in place of the old building which was destroyed by fire. The furniture and equipment in the new office is of the latest Postal standard type. Manager Smith is receiving many compliments from patrons on the appearance of the office.

Max Stone, operator at Waterbury, Conn., has been transferred to the managership of the office at Danbury, Conn., succeeding Miss E. M. Salmon, who was married recently.

Mrs. C. B. Case, succeeds Miss J. A. Frayne, as manager of the Greenwich, Conn., office. The office has been thoroughly renovated and now presents a very up-to-date and neat appearance.

Mrs. F. B. Reid has just returned to duty after being ill for a number of weeks. Mrs. Reid has been employed at the Hoboken, N. J. office as operator for a number of years.

Lineman A. Durie, Norwich, Conn., is still confined to his home on account of injury to his leg.

Clarence H. Mackay Champion at 50

BY SAMUEL J. BROOKMAN

SPORT has furnished some surprising "comebacks" in recent years, but few as sensational as that of Clarence H. Mackay, who in his fiftieth year and after a lapse of nineteen seasons, has just regained the squash racquet championship of the Racquet and Tennis Club. For several days the remarkable performance of the veteran athlete, who is better known to the public as the head of the Postal Telegraph-Commercial Cable Company, has been the engrossing topic in racquet and tennis circles. Even those who saw him triumph in the final over John Terry, Jr., have marveled at the result.

A squash racquets champion at 50! Only a club champion, of course, but when one remembers that the Racquet and Tennis Club boasts some of the most proficient players in the country, men who have been prominent in national title play in recent years, the importance of a club championship looms more clearly. It has not been the habit of the Racquet and Tennis Club to announce the results of its club tournaments. It has kept all such news to itself. This time, however, the committee has been unanimous in the belief that the club championship final offered an item of public interest and the bars have been let down, temporarily at least.

There were thirty-three entrants in the tournament through which Mr. Mackay fought successfully. Everybody in the club knew that the man who held the title in 1902 and again in 1905 could give a pretty good account of himself against some of the topnotchers of the game. He had been paying no attention to tournament play for nearly fifteen years, but he had never given up the sport. The winter season nearly always found him engaged in practice matches at the club and saw him playing a game of high caliber. He had never forgotten his skill, and his frequent athletic activity had kept him in splendid condition.

Mr. Mackay's club members knew that he was still an exceptional tactician at both racquets and squash racquets, yet no one gave any serious thought to his chances of victory when he surprised with an entry in the club championships recently. Playing with rare judgment, however, and overcoming an advantage in speed with superb placing and keen anticipation, the champion of 1902 and 1905 outmanoeuvred and outscored one opponent after another and reached the final.

It took all the craft and nearly all of the reserve at Mr. Mackay's command to turn back a threatening rally on the part of Mr. Terry, the rival finalist, in the title match. The latter after dropping the first two games found Mr. Mackay tiring, and he took advantage of the opportnity to redouble the speed and power of his attack. Terry finally advanced to the important stage where he needed only one more point to tie the score at two games all. The point never came, however, for Mr. Mackay responded with a spurt of his own that brought the score to 17 all, and in the rally that followed the veteran clinched his victory with an untakable placement while the enthusiasm of the gallery boiled over. The score ended 15—11, 15—6, 12—15, 18—17.

Mr. Mackay's placing from the start of the match to the finish has not been surpassed at the club in some time. His generalship was a revelation and his drop shots, perfectly timed, had his opponent guessing in the early stages.

New York City

HARRY HILOWITZ has been promoted to the Managership of the 269 West 23rd Street office.

N. Robus, delivery clerk, of the 8 W. 26th Street office, has been promoted to an operating position in the Third District.

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J. Gallagher has been promoted from the messenger ranks to clerkship at the 8 West 26th Street office.

The new office at 850 Broadway opened up for business on April 1st. The office appointments and fixtures are of the finest and the Second District Superintendent believes that this branch in appearance ranks a good second to the beautiful office in the Straus Building. J. J. Barry, the manager, expects to break all records for receipts.

P. Dispi has been promoted from the 610 Broadway branch office to the 8 West 26th Street office. He has developed into a very fine operator.

Frank Caruso has been appointed operator at the 127 Duane Street office.

T. Fogarty has been promoted from the messenger force to clerkship at the 8 West 26th Street office.

Miss Olga Bloss, of the Hotel Pennsylvania office, is absent on sick leave. Miss Jennie Ryan has been temorarily placed in charge.

WILBUR EASTLAKE, one of the old timers, after a long absence called to see his friends recently.

Michael Callahan, for a number of years the early night overland quad chief, died at his home in Brooklyn on March 9th.

M. Darcy and R. J. Tyrell, of the service department, who have been away for several weeks on account of illness, have returned to duty.

R. J. Walsh, former western traffic chief, has been transferred to the quadruplex department.

Commercial Cable Company

Chester G. Burden, assistant vice-president, has been appointed secretary of the company.

Thomas V. Jordan has been appointed assistant secretary.

From Office Boy to President

THE Commercial Record (New York City) of February 16, 1924, under the heading of "Notables of New York" contains a column article dealing with John Goldhammer's election as first vice-president of the Commercial Cable Company, headed "Office Boy Rose to Vice-President." "Thirty years ago he entered the employ of the company as office boy," reads the article, "hardly an auspicious launching of a career. Many men have started with far more and accomplished much less. During the thirty years of his service Mr. Goldhammer has gained wide experience in the traffic field both abroad and in the United States. He is probably one of the best informed men in the country to-day on such matters. * * * Mr. Goldhammer's career to date might be termed 'From Office Boy to Vice-President.' Such is the fact, and behind it is a record of hard, consistent work—accomplished under competitive conditions where men are judged by results."

Commercial Pacific Cable Co.

Superintendent P. J. Harwood left Honolulu on March 15th for San Francisco on vacation.

Spring Dinner of the Magnetic Club

THE date for the Spring dinner of the Magnetic Club has not been definitely decided upon. It will probably be held in the early part of May. As this dinner will be made the occasion of suitably observing the fortieth anniversary of the inception of The Mackay System, the president has appointed a special committee to prepare a program worthy of the occasion. There have been many notable gatherings of the Magnetic Club in the past, but it is confidently expected that this one will prove a milestone in the club's history.

Telegraph and Telephone Life Insurance Association

Assessment Nos. 814, 815, 816 and 817 have been levied by the Telegraph and Telephone Life Insurance Association, New York, to meet the claims arising from the deaths of Patrick J. Delehanty, aged sixty-four years, Sacramento, Calif.; Carrie Mackay, aged seventy, Philadelphia, Pa.; William H. Dinwiddie, aged fifty-nine, St. Louis, Mo.; George S. Brooks, aged eighty-three, Gardner, Mass.; W. O. B. McCarthy, aged seventy-six, Rochester, Minn.; George D. Maull, aged eighty-two, Philadelphia; Richard J. Bloxham, aged seventy-four, Baltimore, Md.; A. M. Smith, aged seventy-eight, Paterson, N. J.; Charles H. H. Cottrell, aged seventy-six, New Orleans, La., and Robert S. Wise, aged fifty-six, Roanoke, Va.

Electricity and Magnetism

THE fourth edition of Electricity and Magnetism for advanced students, by Sydney G. Starling, B.Sc., A.R.C.Sc., F. Inst. P., price $4.00 per copy, has just been issued by Longmans, Green and Company, London and New York. This is a splendid book as will be indicated by the fact that this is the fourth edition. The book measures five and a half inches wide by eight inches in length and contains 612 pages.

While the main part of the book has been altered very little, the latter part has been modified to bring it more into accord with the developments which have been made in the last ten years. Some account of positive ray analysis, isotopes, and the modern theory of the atom has been included.

The contents of the book are:

Magnetism, terrestrial magnetism, the electric current, electrostatics, electrolysis, thermo-electricity, electromagnetics, magnetic properties of materials, varying currents, alternating currents, units, electromagnetic radiation, conduction in gases, radioactivity, electrons and atoms, examples and index.

Orders for copies should be addressed to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

Described to a T

"CAN you give a good description of your absconding cashier?" sauvely asked the detective.

"We-el'," answered the hotel proprietor, "I believe he's about five feet, five inches tall and about seven thousand dollars short."

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THE WESTERN UNION TELEGRAPH CO.

C. R. FISHER, division traffic superintendent of the Western Division, Chicago, Ill., was a recent New York City general office visitor.

E. R. Shute, operating engineer, New York, is on an extended business trip to the Pacific coast. Mr. Shute left New York on March 17th and will be absent about a month.

Akira Yamasaki, secretary to the Department of Communications, Japanese Government, Tokyo, Japan, was a recent New York City visitor.

W. W. Pulham, division traffic inspector, Mountain Division, Denver, Colo., and P. C. Moore, night chief operator, Winston-Salem, N. C. are in New York, detailed temporarily in the office of vice-president in charge of traffic.

H. A. Emmons, traffic engineer, New York, has just returned from the Pacific Coast, where he has been on a business trip.

Western Union Messengers Entertain at Concert

ON Saturday evening, March 22nd, the Western Union messengers of New York City gave a concert at the Washington Irving High School, 16th Street and Irving Place, New York, which was enjoyed by a very large audience. The arrangements were in charge of Division Commercial Manager B. H. Rivise.

The outstanding feature of the evening was the Western Union Boys' Band whose excellent music was most appreciatively received. Other numbers which were enjoyed by those present were:

Trumpet solo and a musical novelty by Lieutenant Ernest A. Hopf, O.R.C., U.S.A., director of the Western Union Boys' Band, accompanied at the piano by Mme. Franziska Hopf; recitations by Miss Grace Voss; vocal selections by Miss Suzanne Zimmerman, accompanied at the piano by Mme. Franziska Hopf; magical comedy by Mr. Otto Waldman; ventriloquism by Ravonna.

E. D. Cray, executive secretary of the Wall Street Boys Branch Y. M. C. A., delivered a very interesting address.

Prominent among the audience were Newcomb Carlton, president, with Mrs. Carlton, and J. F. Nathan, commercial general superintendent of the Metropolitan division.

CHARGED with having represented himself to be C. C. Spaulding, president of the North Carolina Life Insurance Company, Leo Carlyle, thirty-one, of No. 229 West 11th Street, New York, was indicted a few days ago for forgery in connection with a scheme whereby the Western Union Telegraph Company was swindled out of several thousand dollars by means of bogus drafts.

It is alleged that on October 19 last, Carlyle went to the Western Union office at No. 1450 Broadway, in response to a notice he received from the company, and obtained a check, signing the name "C. Spaulding" to a receipt. When Carlyle appeared at the office of the Western Union Telegraph Company he had the notice, which the company had sent him on the theory that a certain telegram purporting to come from Durham, North Carolina, and signed "David R. Daly," ordering $550 to be paid to C. C. Spaulding at the Hotel Woodstock, this city, was genuine.

HARRY and John Thompson, two brothers who were implicated in the assault and robbery of S. M. Fowler, cashier, and L. R. Williams, time-keeper of the Seattle office, have been convicted and sentenced to jail for a long term of years. The arrest and conviction of these brothers marks the end of the case, the other two men concerned in the robbery having previously been tried and convicted. The robbery occurred while Messrs. Fowler and Williams were carrying the payroll money through a dark hallway connecting the cashier's quarters with the main operating room where employees were to be paid off. Two of the parties implicated were picked up very shortly thereafter, and were promptly tried and convicted. The identity of the remaining two became known, but they had succeeded in completely dropping out of sight. However, it is the policy of the Western Union Telegraph Company to pursue until apprehension and conviction everyone who robs it in such a manner or who is involved in a money-transfer fraud, without regard to the time and expense involved, and it kept detectives on the trail of the suspects until they were finally rounded up and apprehended. Their conviction followed as a matter of course, since the evidence against them was of the most conclusive character. Incidentally a considerable part of the money stolen was recovered by the company.

New Western Union Cable Ship Launched in France

WITH the breaking of the traditional bottle of champagne against the bows, the new cable ship *Cyrus Field* was launched for the Western Union Telegraph Company of New York, at the dockyard of Saint-Nazaire-Penhoet last week, in the presence of a brilliant throng of guests, among whom were Captain J. James, attaché of the American Embassy; Vice President Pendleton, of the American Chamber of Commerce in Paris; S. Goddard, Vice-President of the Western Union Telegraph-Cable Company, London; and many others. The new vessel is stated to be quite a new departure in cable steamers, and is 64.30 m. long, 10.55 m. wide, and 5.64 m. deep, and has a gross tonnage of two thousand tons.

Code Used by Western Union Telegraph Co.

IT is often possible to adapt a method used by someone else to our own line. For instance, the Western Union Telegraph Company has what is known as a telephone code. This is used to insure the correctness of messages taken or given over the telephone. The writer believes that many of the amateurs using radiophone might find such a code useful in handling local traffic by telephone over the

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air. If you are interested, here is the code:

A for Adams; B for Boston; C for Chicago; D for Denver; E for Edward; F for Frank; G for George; H for Henry; I for Ida; J for John; K for King; L for Lincoln; M for Mary; N for New York; O for Ocean; P for Peter; Q for Queen; R for Robert; S for Sugar; T for Thomas; U for Union; V for Victor; W for William; X for X-ray; Y for Young; Z for Zero.

As an example of the way the code is used, if one was to give the initials of the Commonwealth Radio Association, he would say: "C for Chicago, R for Robert, A for Adams."

It is stated that the Western Union Telegraph Company proposes to erect its own building in Portland, Oregon. Plans for the structure are now being prepared. The building will probably be located at the northeast corner of Broadway and Oak Street.

The First Duplex

By Charles Edward Burroughs

In 1869 I landed at 145 Broadway and was assigned to "The West," under Gerritt Smith (days) and Charlie Small (nights).

I was working on what was then known as the "split trick"—1 P. M. to 9 P. M. This gave me the forenoon for "prospecting" as it were; *i.e.*, "catch-ingon" to the details of the telegraph business.

At about that time there was received a set of Duplex instruments, sent over from Boston, the invention of Professor Joseph B. Stearns. We did not attempt to utilize the Duplex because Prof. Stearns had requested that we should defer until he could arrive to supervise its installation. Furthermore, there were only two sets of the duplex instruments in existence—the one we had at 145 Broadway and its companion set at Boston and the professor was anxious that nothing should happen to delay the successful installation of the system.

The set we had was set up down by the windows, at the Broadway end of the building. We were, at that time, limited to single-wire circuits.

In the West we had, among others, the "First Chicago" and Second Chicago." Fred Catlin was on the "First Chicago" and did only sending; as, at that time, he was considered one of the best "long-distance" senders we had. His stuff would get through all of the Nicks-Milliken repeaters and reach "Ch" in beautiful Morse.

I was on a regulation quartette table, working St. Louis. On my left was Al Bagley; vis-a-vis to him was Sam Bogart, with Cincinnati; opposite to me was the "Second Chicago." This was used for receiving from Chicago. This was manned, at times, by Tom Edison because of his wonderfully beautiful copy.

Well, as I was saying, I had the proverbial curiosity of the cat. I wanted to see how in the world one wire could be made to do duty for sending and receiving simultaneously; hence, my activity during my leisure hours.

I first made a pencil diagram of the wiring on the underside of the differential relay, also that of the transmitter. I then traced the wiring to the rheostat and the condenser. Knowing the office of these instruments I quickly understood how one wire could be utilized for simultaneous sending and receiving.

I took my pencil data home with me and, from that, made a neat wiring diagram in colored inks, showing the local and main line circuits. I showed this to Gerritt Smith. He said: "When Prof. Stearns comes show it to him." Finally, the professor came, big eyeglasses and all. If the eyes are "the windows of the soul," those eyeglasses showed me a kindly soul. He certainly was a good friend to me, as will be shown.

I was waiting for a graceful opening, that I might show the professor my drawing. I was more nervous than I had ever been with Patsey Ayres "lambasting" me with forty-five words per minute. In those days we had no viproplex, Phillips' code nor typewriters; we were primative in telegraphy but Fred Catlin, Patsey (Burt) Ayres et al, didn't need any of the speed innovations. As I say, I was nervous. When I caught the attention of Professor Stearns I showed him my drawing. He studied it a few minutes; then, fixing me with those big, plate-glass windows: "Who made this?" he asked, "Isn't it correct?" I enquired. "Yes, it's absolutely correct but who made it?"

"I did," I replied. Then he asked me to give him the details. This to sound me as to my understanding of the principle. "What is the rheostat for?" "To balance the contra-wound helices of the relay." (He smiled.) "Why the condenser?" "To discharge some current while the circuit is open in the transmitter," I answered.

Then he put his hand on my shoulder. "How old are you?" " 'Most eighteen," I replied. All of this time I was coughing and spitting blood into the cuspidor. My lungs were very weak. The professor said he would like to keep the diagram a few days; that, perhaps he might be able to do something for me. "I don't like that cough, my boy; this climate is no place for you."

In a few days Mr. Orton sent for me. (Wm. Orton was then president of the Western Union Telegraph Company.) When I reached his desk he was studying my wiring diagram of the Duplex. He smiled and asked me if I wouldn't like to go out West. "You should get out of this climate. There's too much in you to waste your life here." He procured passes for me, New York to Denver. At St. Louis, Colonel Clowry suggested that I try St. Louis climate. I did. Also I joined the Missouri Gymnasium and started singing lessons. Between the singing and the Gym (and the climate) my chest measurement increased more than four inches in two years and the tubercular germs went up in St. Louis smoke.

Charles E. Burroughs, the writer of this article, will be remembered by the old timers of New York. He was born at Rochester, N. Y., in 1851, and entered the telegraph service at Groton, N. Y., in 1868. He soon afterwards became an operator for the Western Union Telegraph Company at 145 Broadway, New York. He was next operator in St. Louis

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for the same company, and manager of that company's office at St. Joseph, Mo., from 1874 to 1880. He was a salesman from 1880 to 1907 and he was next an operator for the Western Union Telegraph Company at 195 Broadway until 1918 when he did odds and ends in the service until his entry to the New York City Farm Colony (poor house) on Staten Island, N. Y. We are very sorry to add that he is still an inmate of that institution.

Improved Cable Service to New Zealand

As a result of the completion of the new cables between Auckland (New Zealand) and Suva (Fiji Islands) and between Sydney and Southport (Australia) a great improvement has taken place in communications with New Zealand. This has been aided also by the installation of new apparatus at the Auckland station. Prior to the laying of the new cables, a great deal of this traffic from Canada to Australia and New Zealand was routed via Suva, Norfolk Island, and Auckland. Owing to the limited capacity of the Auckland-Sydney cable, delays due to confusion were frequent; but the additional facilities make it possible to reserve the Auckland-Sydney section for communication with New Zealand only. Intercontinental traffic uses the cable between Southport and Norfolk Island.

Delays between Auckland and Sydney have ceased under the new arrangement. The average time for message transmission has been reduced to two and one-half minutes, and checks taken by representatives of the Pacific Cable Board at Auckland show that messages handled at the post office there can be delivered to the Sydney office in seven minutes.

These new cables constitute the first step in the general improvement of communications with Australia and New Zealand. The duplication of the cable between Suva and Bamfield (Vancouver Island), via Fanning Island, will probably be undertaken as soon as the high-speed cable now being manufactured for the Western Union Telegraph Company in England has been installed between New York and the Azores. Tests made by that company on a hundred-mile section furnished last year for experimental purposes have proved so successful that little doubt remains as to the value of the new type.—*Commerce Reports.*

Too Much S O S

"THERE is a growing tendency for the S O S signal to be abused." said Captain F. G. Brown, of the Cunard liner Ansonia, when he arrived at Liverpool from New York.

"We had most severe weather on the outward voyage," said Captain Brown, "and I have never known so many S O S messages. They seemed to be almost continuous.

"The signal no longer signifies that a vessel is in danger of sinking. If something goes wrong with the machinery the S O S is sent out." It is said that British captains are loth to use the message except in dire distress, but that some French and American captains are inclined to panic when difficulties arise.

—*London Daily Express.*

"The Principles Underlying Radio Communication," is the title of a new book just placed on the market. This useful work furnishes official and reliable radio data from the United States Bureau of Standards. It is the most complete and comprehensive book on radio, in convenient size—at a popular price. Includes: elementary electricity for radio beginners; dynamo-electric machinery; radio circuits, electro-magnetic waves; transmitting and receiving apparatus; crystal detectors; radio telegraphy, radio telephony and vacuum tubes. All explained in one compact text-book, and in a language that everyone can understand. For radio beginners, amateurs, operators and class or club use. Free from commercial or professional bias. It contains 352 pages, filled with real radio meat, 268 diagrams and illustrations; attractively and durably bound in full cloth; size 4½x7¼ inches. Only $1.00 postpaid. One correct design, one page of reliable data, one correct formula, pays for the book in reduced construction cost. Think right! Buy right! Build right! For sale by TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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Writes J. J. WALKER

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"Much improvement in speed on typewriter. Can now write by touch without watching keys." Don D. Leonard, Clyde, Kansas.

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No. 8 NEW YORK, APRIL 16, 1924 Forty-second year

CONTENTS

PAGE

Annual Report of the Western Union Telegraph Company for the year Ended December 31, 1923 172
The Western Telegraphy School and the Man who Runs It. By Felix Penne. 173
Canadian National Telegraphs. By C. C. Stewart, Toronto 174
Radio Broadcasting and the Broadcaster. By F. W. Meyer 175
Facts About Electricity Worth Knowing. Point-to-Point Wireless 177
The Situation of the American Telephone and Telegraph Company with Reference to Radio Broadcasting. By H. B. Thayer 178
Power from the Tides. Amateurs are Real Heroes in Blizzard. By Vernal E. Fuller. Automatic S O S Calls 179
Using Wire Telephone Lines for Picking up Radio Programs. By Edgar H. Felix 180
Possibilities of the Radio as Opposed to Cables. Discussed by Western Union Engineer, E. R. Shute 182
The Teletype on the Great Western Railroad of England. Honoring Professor Morse. Institute of Radio Engineers 183
Editorial Comment—Ownership Statement. The Growth of Wireless. Employees Build Many Homes 184
The Railroad-Telegraph and Telephone Section of the American Railway Association. The late Prentiss Warner Drew 187
Radio Corporation of America. How to Get a Raise. Post Office's Four and a Half Millions Profit. The King's Wireless. A Hustled Wedding. 189
Personal. Postal Telegraph-Cable Company. Commercial Pacific Cable Company 190
Western Union Telegraph Company 191
Obituary. Wedding Ceremony Fails to Keep Announcer Silent for Even an Hour. Strike of Marconi Operators in London 193
Dot Sherris, 8 year old, Hailed as World's Youngest Telegrapher. New York Telegraphers' Aid Society 194

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Annual Report of the Western Union Telegraph Company for the Year Ended Dec. 31, 1923

TO THE STOCKHOLDERS:—

HEREWITH is presented a report of the Company's operations for the year 1923. A comparative Balance Sheet and the Income and Surplus Accounts appear as appendices.

Improvements and additions to the property during 1923 increased its book value by $13,416,407, the largest amount ever added in any one year. Noteworthy improvements were made by the replacement of heavily loaded aerial lines in congested centers with underground conduits and cables; the substitution of copper wire for iron wire; and the installation and extension of pneumatic tube systems for conveying messages between main and branch offices.

The new buildings at Philadelphia and Harrisburg were completed and occupied. Land was purchased in New Orleans and St. Louis for new main office buildings and construction begun at New Orleans. New central operating offices, equipped with modern apparatus, were established in Philadelphia, Albany, Indianapolis. A modern fireproof repair shop building, replacing several inadequate structures, was constructed at Chattanooga, Tenn.

The Interstate Commerce Commission's valuation of the Company's land line system is still in progress. The controversy growing out of the Commission's decisions in the valuations of the Texas Midland Railroad and the Kansas City Southern Railway, wherein property, admittedly owned by the Western Union, was partially inventoried to these railroads, has, on reconsideration by the full Commission, been decided in the Company's favor.

At the close of the year the Western Union System consisted of 214,318 miles of poles; 1,528,583 miles of wire, about equally distributed between iron and copper; 2,843 miles of land line cables; 23,282 nautical miles of ocean cables; and 24,678 telegraph offices.

Marketable securities, costing about $6,000,000, were sold to provide needed funds for extensions and additions to the property. The difference between the present market value and the cost of securities now held is small, and is amply covered by a reserve.

The bank balances and cash on hand were audited and verified, and the treasurer's account examined and found in order.

Incident to the purchase, in 1923, of real estate at New Orleans, a mortgage of $87,500, maturing in 1927, was assumed. Federal income taxes for the year 1917, 1918 and 1919, in dispute for over two years, were finally settled in 1923. British taxes since 1914 are still in dispute, although substantial payments on account have been made.

Important land line reconstruction projects, initiated in 1923, are still in progress and the cost of the property displaced will be charged against the depreciation reserve during 1924. The reserve of $2,000,000, set aside in 1922 for ocean cable development, was augmented in 1923 by an appropriation of like amount.

The gross revenues for 1923 were exceeded only by those of 1920, a year of unprecedented general prosperity.

The net operating return from land line operations was, for the year 1923, 6.7% of the book value of the land line property; the average for the past ten years was 5.9%.

Transatlantic cable rates were reduced about 20% in April, 1923, in spite of which, cable system revenues for 1923 declined less than 10%, as compared with 1922.

Taxes continue to grow and bear heavily on the Company. Were it not for the amount now set aside annually for taxes, net income would be about 35% greater.

Western Union average wages are today higher than they were in 1920, although the cost of living has declined 20%. Neary 60% of the gross revenues of the Company are disbursed for employees' wages and benefits.

The employees' Income Participation Plan, inaugurated in 1920, and in effect during subsequent years, has paid about $6,700,000 to employees.

Expenditures for employees' pensions, disability benefits and death benefits amounted to $1,388,600 during 1923, and since the inception of the plan in 1913, have aggregated nearly $10,000,000. The cost of vacations with pay in 1923 was nearly $1,900,000. The practice of observing Saturday half holidays with pay was extended during 1923 to the operating forces so far as consistent with the requirements of the service.

The three Associations representing the Company's employees, i. e., Land Line System, Cable System in North America, and Cable System abroad, have diligently worked for the common welfare of the employees' and the Company. Negotiations between the employees' representatives and your officers have been governed by a spirit of cooperation and good will.

Land line and cable messages were handled for the Government by the Company in 1923 at $749,000 less than the cost of operation and $924,000 less than the corresponding business would have yielded at commercial rates. This burden still bears heavily upon the Company's earnings. Renewed efforts to obtain an increase in the Government rate were made in 1923, and the matter is now before the Postmaster General.

At the close of 1923, there were 26,276 shareholders, an increase of 457 over last year; of the total number, 24,654 held 100 shares or less and of these 18,960 held 25 shares or less.

All seven Western Union transatlantic cables have now been equipped with the recently developed apparatus for direct working between American and

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European termini. A two-conductor cable was laid between Valentia, Ireland, and Sennen Cove, near Penzance, England. The cable stations at Canso, N. S., and Duxbury, Mass., were refitted and modernized. Twelve dwellings were erected at Canso, N. S., for the accommodation of employees. A new cable ship, "Cyrus Field," is being built by Société des Chantier et Ateliers de St. Nazaire (Penhoët), France, and will be in commission in the Spring of 1924.

The development by the Western Electric Company of a new type of ocean cable, loaded with "Permalloy", has been mentioned in previous reports. Extensive tests on a trial length, laid in deep water, indicate the commercial value of this type of cable, and verify the estimated increase in speed over that of all other types of deep sea cable. Since the first transatlantic cable of 1858, all cables have been of practically the same type, differing only in size and weight. It is gratifying to record that your Company now initiates the first important change in cable laying in over fifty years.

Under an arrangement with La Compagnia Italiana dei Cavi Telegrafici Sottomarinin, the Western Union will lay a cable, of the new type referred to above, from New York City to Horta, in the Azores, and the Italian Company will provide a cable from the Azores to Spain and Italy, establishing for the first time direct cable connection between the United States and these two important countries, and thus affording a much needed direct route for traffic with Southern Europe and countries beyond. This cable will probably be ready for operation by the Fall of 1924.

Reference was made in last year's report to the restrictions imposed upon the Company's operations in France by Governmental regulations. In consideration of the preservation of the rate differential in favor of the French Radio System, which operates under the auspices of the French Government, American cable companies were granted, in 1923, facilities equivalent to those enjoyed by the Radio System. Following this an enlarged Western Union office was opened on the Boulevard des Italiens, Paris.

In April last, the transatlantic radio rates were generally raised and the corresponding cable rates reduced, resulting in approximate equality. The elimination of the rate differential, on the basis of which radio traffic had been developed, resulted in immediate and sustained additions to Western Union cable business. The effect of wireless competition upon ocean cable traffic has been closely observed for several years. It is our experience that, where cables can be assured efficient land line connections, as for example, in Great Britain, France, Italy, Germany, The Netherlands, and Belgium, the cables will hold the business as against wireless competition.

Respectfully submitted, NEWCOMB CARLTON,
President.

The Western Telegraphy School and the Man Who Runs It

BY FELIX PENNE

"I'll put a girdle round the earth in forty minutes." Says Puck in "A Midsummer Night's Dream."

THIS was one of Shakespeare's flashes of prophetic imagination. Modern science has far outdone the promised feat of Puck. A radio message far outstrips in speech the dream of Fairy Land. Science, the science of speech, especially is moving forward by leaps and bounds and one man who keeps abreast of progress—who is "up-to-date" to "the unforgiving minute" is J. W. Kinnarny, who conducts "The Western Telegraphy School" in the Duncan Building, 119 Pender Street West, Vancouver, B. C.

The telegraph operator of today, though his work seems to border on the miraculous, has to be carefully trained in operations which are many and complex—in which "exactitude" is as necessary as in mathematics—and fortunate indeed Vancouver is to possess a school where this training can be had under such a man as J. W. Kinnarny, whose knowledge of telegraphy and all that pertains to it, is like Sam Wellers' knowledge of London—"extensive and peculiar."

J. W. Kinnarny has had telegraphic experiences on great railways, large telegraph lines and in the Great War. He had to do with installations and workings where a fault or error meant disaster—perhaps death—for hundreds and he has learned—and he teaches, that a telegrapher must be "thorough."

A visit to "The Western Telegraphy School" is an education even for one who does not intend to follow telegraphy as a profession.

The tick-tack of the instruments, the tip-tap of the typewriters was bewildering—at first, even to one who has worked amidst the rattle of printing presses and the rhythmic beatings of linotype machines, but how soon was I convinced that "Order, Heaven's first law" made the school a model of accurate efficiency. It is this order, the result of knowledge and a genius for organization which allied to a splendid equipment, enables Mr. Kinnarny to turn out efficient operators in half the time pupils spend in some schools in Britain and the United States—schools which have yet deserved a good reputation.

"What shall we do with our boys and girls?" That is a question which confronts every father of a family. It is good to know of an establishment where the young, and even those far past youth can be efficiently trained for a profession interesting, indeed pleasant, which is not over-crowded, where the emoluments are worth the winning.

During the past four and a half years Mr. Kinnarny has trained and placed a great many students in positions with different telegraph and railway companies and has established valuable connections throughout the West; in proof of which I refer to the many letters of appreciation on file, received

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from both former students and employers.

Telegraphers who have gotten out of practice and gone rusty, come to this school for a brush-up on the fast wires, and wireless men changing to the American Morse code also take advantage of the opportunity to know both codes.

A layman's opinion may not count for much—but I happened to be in the school when a party of prominent telegraphic officials were also there, and their words of praise for "a wonderful equipment" were far more eulogistic than I would have the temerity to utter.

Backed by knowledge, "praise from Sir Hubert is praise indeed." One characteristic of this school I can, however, dwell on with the warmest approval. The pupils do not only work with "practice" or "dummy" instruments. They deal with messages "hot from the wires" from Seattle and other distant places. The whole school is pulsating with the telegraph, wireless and radio of real life. From the very beginning of a course, the pupil feels he is doing work of the real work-a-day world, and progress is accordingly rapid.

Telegraphy, typewriting and telegraph bookkeeping are taught in the school, railroad telegraphy, computing of tolls, care of apparatus, theoretical and practical line work, handling train orders, general railway work, and lectures on the care of electrical telegraph equipment and their up-keep are given from time to time.

Not all pupils are equally "apt," but sometimes the least promising pupil turns out "a surprise"—and in the records of the school it may be said—speaking broadly—there is no such word as "fail."

Mr. Kinnarny certainly is doing splendid work in training young people in a profession where employment is practically certain—and progress equally certain for those who have ambitions and the will to realize them.

This article will miss its point if I do not make it clear that J. W. Kinnarny and his school has a deep interest even for those who may themselves not need such training as he gives. Make the acquaintance of "The Western Telegraphy School" and you will be sure to recommend it to those to whom it will prove—A BOON.

———o———

Canadian National Telegraphs

By C. C. Stewart, *Toronto*

Arrangements are under way to move the Toronto Main Office from the corner of Scott and Wellington Sts. to the Lawlor Building, Northwest corner of King and Yonge Sts.

The old site of the Toronto office has been occupied by the Canadian National Telegraphs and its predecessors since the building was erected nearly sixty years ago. With the rapid growth and distribution of financial and wholesale houses, the new site at King and Yonge Streets will be more suitable for serving the needs of users of the telegraph.

The building at the Northwest corner of King and Yonge Sts. consists of five stories, comprising approximately three thousand square feet on each floor On the main floor, the receiving and delivery offices will be located: the second floor will be used for the bookkeeping department and gymnasium: on the third floor, a training school. Service and telephone departments will be located: the two top floors will be used for operating departments and rest rooms.

It is the intention to renovate and lay out the old building in such a way that it will be suitable for business offices in that district.

About one hundred messenger boys from the staffs of the Main and Branch Offices of the company in the City of Toronto, were tendered a banquet and entertainment at the Central Y. M. C. A. on March 26th, under direction of the Local Manager, G. H. Walters.

The boys in their natty uniforms filed into the banquet hall at 6.30 P. M., and from then until the final performance at 10 o'clock, there was constant evidence of untiring energy and wholehearted enthusiasm throughout the assembly. Although the boys had been on duty from early morning riding at top speed through the busy thoroughfares of the city with urgent despatches, there were no signs of fatigue.

Songs were introduced between courses of the dinner as an aid to digestion, and to promote good fellowship. Afterwards short addresses were given by Chas. E. Davies, acting general manager, W. G. Barber, general superintendent and George Hogarth, commercial manager, Toronto.

Alluding to the opportunities confronting the boys in the National Service, Mr. Davies reminded them that he entered upon his career as a messenger boy about twenty-eight years ago. Most of the present executives and officials of the Company began as messengers and every effort would be made by them to train the boys for the higher positions of future days. The important link that the messenger boy represents in the chain of service, the Company's representative at the beginning and end of the telegraph transaction, was also emphasized.

At the close of the banquet, moving pictures of an educational and amusing nature were shown. Then followed attendance at the final rehearsal of the Y. M. C. A. Minstrel show for a half hour.

The next item on the program called for boxing bouts between members of the messenger staff on the Gymnasium floor, and the contests were keenly followed by the interested spectators.

The evening's activities were concluded in the swimming tank, where the boys appeared to enjoy themselves to the fullest degree.

Before dispersing three hearty cheers and a tiger were given for Manager Walters and those who so ably arranged this program. It was unanimously agreed that assemblies of this nature were of inestimable value and will be frequently held in the future.

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Radio Broadcasting and the Broadcaster

By F. W. Meyer,
Westinghouse Electric and Manufacturing Company

Because we are all more or less apt to think of ourselves first, it is natural that radio set owners think of radio broadcasting only insofar as it affects themselves. They sit down to their sets after the evening meal, light up their pipes or cigars, turn the dials and prepare for an evening's entertainment. Then it seems that the whole world is under the control of their finger tips.

By turning the dial in one direction a famous orchestra from New York is heard. A little further turn permits the reception of a talk from Washington by internationally known statesman on current world problems. Then prize fight returns are heard direct from some ringside, where seats are sold at a premium. And still a further turn of the dial and there is heard an organ recital from a closely packed auditorium in Philadelphia, or a lecture given as a part of a university course in some science, from Springfield, Mass. A flip of the dial the other way results in patriotic music from a military band in Oklahoma, filling the room with bell-like clarity.

Then a further turn of the dial and the Sextette from Lucia, from the Chicago Grand Opera Company transforms your home into an opera house, or your home becomes a theatre when you "tune in" on the WGY players at Schenectady during the progress of "Daddy Long Legs" or some other play. It may even be possible to listen to a member of the English nobility speak from his home in the United Kingdom, a lecture delivered in Spanish from Cuba or programs from Mexico, Hawaii or from other far distant places.

Truly, in these days a radio set ought to fill one's evenings with thrills, excitement and pleasure enough for complete contentment. Yes, all this is very wonderful and acceptable to the radio public but how many really appreciate what it means? How many feel what they owe to the companies and individuals that made this possible? How many realize the years of study and experimentation necessary and the enormous expense required to give us radio broadcasting? This side of broadcasting is frequently given little thought. Let us reflect a little on the marvelous progress that has been made in radio broadcasting since its birth, slightly more than three years ago.

It all started with the radio amateurs. With the invention and development of the vacuum tube, radio telephone sets gradually come into favor with this hard-working fraternity of enthusiasts, and the beginning was made when some bright amateur conceived the idea of sending phonograph music to his friend who lived perhaps in the next block.

The idea gained popularity, and it was not long before some of the amateurs broadcasted programs. A Pittsburgh amateur, Frank Conrad, a Westinghouse engineer, was especially prominent in this service, and his success did much toward inducing the Westinghouse Electric & Manufacturing Company to broadcast. This resulted in the establishment of the Westinghouse Company of KDKA, making it the first radiophone station in the world to broadcast regular programs.

At first, phonograph music formed the entertainment and in spite of delays, poor transmission, breakdowns and other troubles, the idea caught people's fancy and letters by the hundreds came pouring in. It was not long before other stations were started throughout the United States.

And then radio came in to stay. Meanwhile, great progress was being made by the broadcasters. Old and obsolete apparatus gave way to new; the design of equipment became a study; exhaustive experiments were made, and as a result, broadcasting stations improved their transmission and increased their power.

In programs, improvements were also made. Each station had and still has a group of men, known as "checkers," whose business is to check programs by receiving sets installed in their homes. In this group is usually included the announcer who can check with his eyes as well as his ears because of being in the studio itself. The checkers are really the judges of the stations. From their reports, poor talent and objectionable parts are eliminated from the program, delays are overcome, and clear modulation and transmission are facilitated.

Along with this advancement came the inception of more studios in chosen localities and the installation of what are known as "pick-up" stations in churches, auditoriums, ball parks, theatres, and public places, the function of which was to carry the programs given in these places to the broadcasting station proper, there to be amplified and broadcasted.

Progress in this direction is indicated by the fact that the Westinghouse Company has nearly forty of such stations installed permanently in the city of Pittsburgh and, of course, many more in other cities. By means of these "pick-up" stations, even though the broadcasting station may be situated in an out-of-the-way place, there is seemingly no limit to the events and programs to which the radio audience may listen.

And now, the latest achievement, and the most marvelous of all in radio engineering, is the establishment of relay or repeating stations in different sections of the United States and in other countries as well. These stations pick up at a short wave length the programs broadcasted by one station, then repeat it on a longer wave length. In this manner the programs of KDKA picked up and repeated by KFXX, Westinghouse station in Hastings, Nebraska, and by the Metropolitan-Vickers Electrical Company's station in Manchester, England, are heard in most parts of the world.

As these repeating stations increase in number, it will become possible for people in any part of the world to receive perfectly, with moderately priced

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apparatus, programs given from a "mother-broadcasting" station, though it be many thousands of miles away. A marvelous achievement and a great and rapid advancement in the art—all in three years.

The preparation of programs is the most persistent of the many great problems that confront the broadcasting stations. It was comparatively easy in the days when phonograph records were used, because the records could be chosen from a catalog. Care only needed to be exercised that the selections be well adapted for radio use, because, in the early days of radio certain instruments and voices did not reproduce as faithfully and clearly as they do now.

However, after records were abandoned, by necessity to please a critical public, the position of Program Manager became an exceedingly important one. Then the Program Manager had to remember certain things that he is forbidden to broadcast. Included in these are copyrighted songs or features, on which his station pays no royalty, advertising of any form, greetings to another station or to a person, and anything that is of only local interest.

Aside from these points, his constant care is that his programs be diversified. One evening he may select an organ recital, the next a hotel dance orchestra, then an evening of vocal and instrumental numbers, and so on.

To aid in this work, most if not all, of the stations send out questionnaires to artists who might be interested in giving their services. These questionnaires, properly filled in, usually disclose sufficient facts about the prospective entertainers to permit the program manager to decide on their abilities. It is very important that he make no mistake in this direction for if the program is not up to standard, the station loses favor with the radio audience.

Sometimes a station goes so far as to stage a contest to ascertain just what kind of programs the radio audience wants and makes suitable arrangements for the giving of prizes so as to get a representative number of opinions. Then the programs are planned accordingly.

Often, too, the Program Manager encounters difficulty in his work. Perhaps for an evening he has arranged a particular good program when something unforseen occurs and it has to be cancelled; or perhaps he has counted on a certain entertainer but learns that pay for the entertainment is expected. This means he must seek further, because artists are expected to give their services without remuneration other than the publicity they get from the broadcasting.

For this reason, few stations make use of copyrighted songs. It is felt, and it has been proven often, that broadcasting a song really increases its sale; but even so, the publishers of such songs demand a royalty. The only case of entertainers being paid for their efforts is where a broadcasting station maintains its own talent, its band or orchestra.

Many other things make the position of Program Manager a difficult one, but it is not necessary to enumerate them. The difficulty of his position and work can be appreciated by the realization that what he has to do is to please more than a million people every day with the programs he selects.

Radio broadcasting is not accomplished without a great expense. First, there is the cost of the original installation of equipment which amounts to several thousand dollars. Then there is the maintenance cost of the equipment, which, with the salaries of the maintenance force, sums for entertaining artists, taxi and automobile hire, renewed apparatus cost, installing pick-up stations, and opening new studios and furnishing them, amounts, in the case of the larger stations, to over $100,000 a year, an amount representing the capitalization of not a few businesses. With about six hundred broadcasting stations in the United States, a stupendous sum is being spent yearly to entertain the radio public, for which it pays not one cent, except the initial cost of the receiving sets.

Does radio broadcasting pay the broadcaster? A logical, if bromidic, answer to this question is: yes, or he would not broadcast. But the fruits or remuneration are in tangible form, so that it is impossible to insure full value received. Publicity, or advertising, is all that the broadcasters receive for their services. But they are not permitted to advertise directly by radio, such as calling the listeners' attention to their products.

When the announcer gives the name and call letters of his station, he has done all that he is permitted to do. This seems to be rather indefinite advertising, but it has desired effect of making his company known to a larger number of people than could ever be reached by a magazine or newspaper advertisement. An instance of the effectiveness of this kind of publicity, is cited. A broadcasting station in Philadelphia operated by a department store, is known by a listener, in Kansas City who is contemplating an early trip to that City. With the name of the store graven on his memory by radio, is it not reasonable to assume that he will pay that store a visit when he goes, and do his shopping there?

Then consider that a good many of the broadcasters are manufacturers of radio apparatus. These are bound to inspire the buyers of their products with confidence in them. Very important as well is the publicity given the broadcasters by the newspapers. They print the programs, and because of the widespread interest in radio, they are willing to publish articles regarding the broadcasters and their activities. In fact, many can show, as a day's clippings, enough printed matter to make up a newspaper as large as a Sunday edition of a New York newspaper.

Radio undoubtedly has progressed more rapidly than any other science. This is chiefly because it is effecting so many benefits to mankind. It will continue to advance at a marvelous rate. The remark-

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able achievements in so short a period make it impossible to predict what may be accomplished in the next five years, or, as one great radio engineer states, even in the next year.

Facts About Electricity Worth Knowing

ELECTROMOTIVE FORCE.—The power which a cell of battery possesses of causing the transfer of its current from one place to another is its electromotive force. In other words, the electromotive force of a current is its power of overcoming resistance—its energy. To use a familiar comparison, electromotive force is to a current what pressure is to steam.

QUANTITY.—The amount of current that is evolved in a given time by a cell of battery is termed its quantity. This amount may be increased or diminished by lessening or increasing the resistance in circuit both in the battery and external thereto.

CAUSE OF THE FLOW OF THE CURRENT.—While chemical action is being constantly accumulated, or piled up, at the positive pole of the battery, with a vigor depending entirely upon the electromotive force of the battery.

The old theory, that the current thus accumulated flowed along the line wire to the ground at the distant end, and back to the other terminal of the battery through the ground, is now generally abandoned, and the theory of M. Gavarret accepted as correct.

He teaches that the earth being a common receptacle and reservoir of electricity—hence termed the "common reservoir"—has no electrical tension.

When the current in a battery accumulates at the positive pole of the battery, its tension is greater than that of the earth. Now connect a wire from each end of the battery to the ground. If these wires are short and thick, thus having practically no resistance, the current will flow from the positive pole of the battery through the wire to the earth with a degree of energy depending upon its excess of tension over that of the earth. This action will continue, the earth receiving and absorbing from the positive pole of the battery where the tension is greater, and giving to the negative pole where the tension is less, until the action of the battery ceases from exhaustion, and the tension of the battery and the earth are equal.

The effort, then, of the current evolved by the battery, is to equalize the tension or pressure, and produce an electrical equilibrium. This same equality of tension between the clouds and the earth, is the cause of lightning-storms.

LAW REGULATING THE FLOW OF CURRENT.—If, in the case above supposed, the wires connecting the battery with the earth, were so long or so thin, as to interpose considerable resistance to the passage of the current, the flow would be less in amount, and the chemical action of the battery less rapid—the current being dammed, or chocked back, by the resistance to its passage.

The amount of current, then, that will flow to line, depends upon and is proportionate to the resistance of the circuit. Hence Ohm's law, which is the foundation of all electrical measurements.

Ohm's law is stated thus:

C being the amount of current,
E the electromotive force, and
R the resistance in the circuit.

$$C = \frac{E}{R}.$$

or, the current flowing to line, equals the electromotive force divided by the resistance.—*Haskin's Galvanometer.*

Point-to-Point Wireless

SENATOR MARCONI claims to have discovered a means of sending wireless messages which practically ensures that they reach their intended destination "untapped."

The waves by this system travel in a straight line from station to station along a single "beam" instead of being broadcast in all directions. The greatest drawback to wireless communications has hitherto been the impossibility of ensuring their secrecy.

While an ordinary aerial transmits equally well in all directions a station fitted with "reflectors" can be arranged so that the useful portion of the wireless beam may occupy only some thirty degrees out of the 360.

Again, the power sent out from a "beam" station may be so adjusted that it is not strong enough to give good working signals unless the receiving aerial is also fitted with a reflector facing the distant transmitter.

"I have already succeeded in sending messages on a 'beam' over a distance of 2,000 miles," said Senator Marconi. "The new method gives a rate of working far beyond anything yet achieved, and a marked reduction in the cost of construction of stations and great economy in their working."

Mr. Godfrey Isaacs, managing director of the Marconi Company, is equally enthusiastic regarding the importance of the new development.

"It means scrapping a number of existing plants," he said, "but wireless science is still only in its infancy."

"The new system will be provided for in the construction of the Marconi station under erection in South Africa.

"What effect the invention will have on the recommendations in the report just issued by the English Government it is impossible to conjecture, but it should certainly lead to a reconsideration of some of them. We are prepared to submit a programme which will provide for the linking up of the whole Empire by a wireless system more complete and efficient than anything hitherto contemplated."

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The Situation of the American Telephone and Telegraph Company with Reference to Radio Broadcasting

By H. B. Thayer, *President*

In view of the conflicting accounts and interpretations of the suits recently instituted by the company to protect its patents affecting radio telephone broadcasting; it will perhaps be helpful to relate the circumstances that resulted in the present patent situation.

Some time before the war the Bell System research laboratories began development of what is now called the vacuum tube, as a long distance wire telephone amplifier or repeater. It was this development that made possible transcontinental telephony.

The laboratories of the General Electric Company had also undertaken the development of this apparatus for other purposes.

As was inevitable, with two great experimental laboratories engaged in similar research, each company acquired inventions and improvements of mutual usefulness.

With the coming of the war and the paramount requirements of the Army and Navy in the field of communications, each company put aside considerations of patent ownership, and there was rapid cooperative development of this apparatus in its application to transmission by wire and wireless.

When the end of the war ended the necessity for this emergency disregard of patent rights, a valuable art had been developed which no one in the business of communications could use without infringing upon the rights of others.

Under such conditions there could be no further manufacturing of certain apparatus, nor further development of this art, and the Navy Department of our government requested this company and the General Electric Company to try and relieve the situation for the general welfare.

In response to this request negotiations were initiated and carried through to an arrangement of cross licenses to which other owners of patents in this field were afterward admitted. For practical operation under this arrangement, it was necessary that the parties to the agreement be given the specific uses of the apparatus in question that were logical to their business.

It was in this way that licenses for certain uses in connection with radio telephony came to us, as our directors reported to the stockholders at the time.

This company's prime purpose in operating under these licenses has been such development of the radio art as would be useful in relation to telephone service.

Actuated by this prime purpose, we established an experimental broadcasting station in New York in order to be better able to study not only radio transmission problems, but also public taste in broadcast entertainment, and to furnish advice to our Associated Companies with respect thereto.

By this time there was widespread popular interest in broadcasting, as was evidenced by the growth of the industry furnishing apparatus for radio reception. A realization of the extent of this interest led to a sudden demand for broadcasting stations from individuals and concerns wishing to establish a contact with the public for their own benefit by means of matter transmitted through the ether.

Consideration of many of these applications disclosed that all of the economic factors involved, as well as the high costs of operation and maintenance, had not been fully realized. It was apparent that if there were a large sale of broadcasting apparatus, some purchasers would experience disappointing results. It was also clear that a multitude of stations would create a condition of congestion that would certainly lessen, and might possibly destroy, the value of broadcasting to the public.

From the financial standpoint it would have been profitable to manufacture and install all the broadcasting apparatus sought for. We deemed it a better policy, however, to point out all the factors and risks of the situation, and for those wishing to broadcast, to offer our own station at moderate rates, so far as our allotted time limits for broadcasting would permit.

We are confident that by thus assisting in checking tendencies that were putting the future of broadcasing in jeopardy, we have acted only in the best interests of the public.

Broadcasting is made possible by inventions that have cost their owners large sums not only in acquiring patents, but also in experimental and development expense. We have recognized the fact that many broadcasters, in making wrongful use of our inventions, have been ignorant of their infringement. We have, therefore, established reasonable license fees, the payment of which coupled with an agreement to refrain from further infringement would liquidate any claims for infringement and would give the broadcaster a legal right to the use of the patents during their life. The fees are so moderate as to represent a return far below the customary profits on unpatented electrical apparatus.

With approximately 400 stations in the United States using our inventions without a license from us, it became a matter of ordinary prudence for us to institute legal proceedings that would establish our ownership of patents and our rights as owners. Not to protect them would be sheer neglect of duty.

For an initial suit we decided to select a nearby station so as to minimize the costs to both parties concerned. Pursuant to this plan, we respectfully called to the attention of the owners of a station in New York, the nature and extent of their infringement, listing many of the patents involved. Our notification was ignored and suit was brought.

A suit was also brought against another defendant in relation to methods of sending programs of entertainment along wires, which methods we believe infringe upon our patents and which might inter-

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fere with operation of neighboring telephone service. Obviously, this suit is also a matter of plain business prudence.

We have been asked what our future policy will be in connection with radio broadcasting. The art of radio broadcasting is new and changing. Speculation as to the future is difficult and futile. The new problems which are constantly presenting themselves are being given the closest study, but the details of our plans could only develop as the art develops. The general guiding principles are not likely to change. They are: that we keep in and abreast of the development of the art and that we encourage in every way possible such development by others. We shall make it possible, so far as lies with us, for any one to secure broadcasting apparatus at moderate prices; and for those broadcasters who are now infringing our patents, to continue their use under reasonable and moderate terms. For the present we shall continue to operate our own experimental broadcasting station, making its facilities available under reasonable rules, in the public interest, for those who wish to test broadcasting as a medium for attracting the public's notice. Far from desiring the sole responsibility for broadcasting, it is our strong belief that, in the public's interest and in our own interest, nothing should be allowed to interfere with any development of it that may be proved to be beneficial. We heartily favor government control of such activities and the federal legislation that is pending has our cordial support.

A monopoly, either of broadcasting for entertainment of the public or for hire is not desirable from any point of view. There has been no danger and is no danger of such a monopoly.

Power From the Tides

ACCCORDING to a Paris despatch, France is ahead of other nations in efforts to derive power from the tides.

On the North coast of Brittany, at Aber-Vrach, an experiment in harnessing the ocean is to be made shortly on a large scale.

The tidal flow up and down the small river Diouris is very strong, measuring a height of 25 feet. This in itself, of course, does not excite great wonder as the like phenomenon in the Bay of Fundy changes level twice a day to the extent of 65 feet, but it is sufficient for the object in view.

The French engineers expect to obtain a constant supply of electricity of 3,800 horse-power, and this in two years would pay for the construction of the two dams which are to impound and control the tidal water and other mechanical installations necessary.

If success is attained at Aber-Vrach, there is no doubt, but that similar enterprises will spring up in other countries, in fiords of Scotland and Scandinavia, and the inlets of New England, New Brunswick and Nova Scotia furnishing favorable natural conditions.

Amateurs Are Real Heroes in Blizzard

By VERNAL E. FULLER

AMATEUR radio operators situated in Northern New England were of great help during the big storm which recently swept this section of the country.

One of the first to seek the assistance of amateurs was the superintendent of telegraph of the Boston & Maine Railroad. When he found it impossible to get train reports through the regular channels, the superintendent got in touch with Waldo J. Kelley, radio 1CPI of Watertown, Mass., and asked if it was possible to communicate with the principal cities along the line. Mr. Kelley succeeded in raising P. Francis Hahn, radio IHK of Manchester, N. H., and after three hours of hard work through interference of all kinds, was able to report to the superintendent that everything was clear between the cities of Boston, Dover, Portsmouth and Portland.

While the B. & M. traffic was being cleared, officials of the New York, New Haven and Hartford Railroad called Kelley and asked him to reach stations in the vicinity of Cape Cod. Finding that station 1RA in Somerville was in commission and ready to help, Mr. Kelley assigned the southward traffic to him. This station soon located three trains between Boston and the Cape.

When he reurned from his day's work, George W. Lang, operator of station IKA, of Somerville, was pressed into service and picked up Elio G. Gavallini, operator of 1RR, who was in charge of the Western Union Telegraph office at Plymouth. He took his report of conditions and quickly turned it in to the Boston office.

Realizing that it might be necessary to operate during the "quiet hours," Charles C. Kolster, supervisor of radio at Boston, gave Mr. Kelley and Mr. Lang permission to operate. It was not necessary however, as the service was then straightened out.

Automatic S. O. S. Calls

FOR two years engineers of the English General Post Office and various wireless companies have been endeavoring to solve the automatic S. O. S. problem by means of a call device which will respond automatically to the distress or alarm signal. Both the Admiralty and the shipping companies are anxious to secure a satisfactory apparatus capable of standardization. The Chamber of Shipping recently arranged for the Rathlin to carry out trials of automatic call devices. Three sets were tested—those of the General Post Office, the Marconi Company, and the Radio Communication Company.

An interim report has been issued by the Admiralty on the results of the first series of tests. While the General Post Office set was the most sensitive at longer ranges, the greatest number of correct calls was obtained by the apparatus of the Radio Communication Company.

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Using Wire Telephone Lines For Picking up Radio Programs

By Edgar H. Felix

Completing a long distance telephone call is a relatively simple task. Sitting at your desk in New York, you call the operator at the local exchange by lifting your receiver from the hook, ask for "Long Distance," and have name and location of the desired party recorded. In a few minutes your friend in Chicago is ready to talk to you.

So many people do this daily that calling Chicago from New York has become a simple routine task for the staff of the telephone organization. Standard equipment and circuits are used as well as regular operators working on their usual tours of duty.

During the last year, long distance telephone circuits have occasionaly been used in connection with radio broadcasting. In these cases, the telephone lines have been mustered into a most unusual task differing radically from ordinary long distance telephone communication. Specifically a much wider range of frequencies than is necessary for ordinary conversation must be transmitted by these lines without noticeable distortion and special precautions to avoid line noises must be taken.

Reproduced sounds have two qualities, intelligibility and naturalness. In commercial telephone service, the first is of prime importance. In broadcasting, however, naturalness must also be considered, for without it, there is little or no entertainment value to radio programs. We seek not only to communicate words so that they are intelligible to the listener, but to convey faithfully every intonation of voice and instrumental quality. This necessitates transmission over a much wider band of frequencies than required for intelligible speech.

To the layman, adapting a telephone line to a wide range of frequencies may be a meaningless phrase. Let us consider just what is involved in this task. Sound is caused by air waves which cause the diaphragm of the ear to vibrate. These vibrations in turn cause the auditory nerves to register an impression upon the brain center of hearing. In speaking, the vibrations to which the ear-drum responds lie between approximately 100 impulses per second and about 10,000.

It has been found that a system which transmits frequencies between 500 and 2000 reproduces speech sounds which are easily understood, although lacking somewhat in naturalness.

In listening to the music of a symphony orchestra response to a much wider range of frequencies is necessary. When a musician strikes the "C" one octave above the middle "C" on the piano, the ear drum vibrates 517.31 times per second. When a flautist sounds a tone of the same pitch, the ear drum also vibrates at the same frequency of 517.31 vibrations per second. The difference which the hearer notices between the music of the piano and flute lies in the harmonics or over-tones. The first harmonic is 1,034.61 vibrations per second, the 91 times. There is also energy distributed on the second is three times the fundamental tone or 1,551. third, fourth, fifth and higher harmonics.

The distinguishing character of each instrument is determined by the relative value of its harmonics. For instance, one instrument may radiate 50% of energy on the fundamental, 12% on the first harmonic, 18% on the second, 10% on the third, 3% on the fourth, and 2% on the fifth and the balance on still higher harmonics; another instrument may radiate 45% on the fundamental, 30% on the first harmonic, 12% on the second, 6% on the third, 1% on the fourth, 5% on the fifth and 1% on higher harmonics. Although relatively small energy is present in any one harmonic, to secure accurate reproduction, it is essential that the broadcast transmitter not only broadcast the fundamental tones which give recognizable pitch but also give accurate reproduction of the harmonics. Otherwise, the flute, violin and piano lose much of their naturalness, so that it is difficult for the listener to distinguish between them.

This requirement makes very important preparations necessary in order that a line may be suitable for radio broadcasting. In ordinary long distance communication, understandable speech requires that the line be adapted to faithful transmission of a band of frequencies of about 2,000 cycles or more. Because of this fact, we are able to use one single telephone line simultaneously for as many as eight different channels of communication. When the operator connects you with Chicago, you have placed at your disposal a channel of communication, and not as is generally supposed, a simple pair of wires. There may be several different telegraph messages and two or three telephone conversations going on over the same wire which do not in anyway interfere with your own conversation.

When a line is used in connection with radio broadcasting, however, the very wide range of frequencies used makes it necessary to alter the circuits so that a "clean pair" of wires is available. All services ordinarily carried over the wire must be re-routed over other circuits. Furthermore, the accuracy with which this wide range of frequencies must be transmitted makes it necessary to employ special balancing equipment which overcomes the distorting effect of certain electrical qualities inherent to all wire conductors. To install and adjust the balancing equipment the services of highly trained engineers are required. Numerous tests and measurements to determine the carrying qualities of the wire line over the entire range of frequencies are made. Based on these measurements inductances, capacities and other apparatus are installed so that ultimately good transmission is secured for all frequencies. Because of possible emergencies two pairs of wires are always prepared.

The rerouting of circuits, to make a "clean pair" of conductors available for broadcasting, is never undertaken unless it can be done without affecting regular commercial requirements of the telephone

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service. The extensive preliminary tests required for broadcasting must take place at such times when regular commercial communication is the least. This is usually in the early morning hours. The summoning of highly skilled engineers for this work tends to disrupt the schedule of other work to which they regularly devote themselves. They must be sent to distant points, involving considerable overtime and travelling expense.

Another fact of vital importance in preparing telephone lines for use in connection with radio broadcasting is that the output of the lines at the broadcasting end is amplified millions upon millions of times before it is finally radiated into the ether by the radio station. As a result, even the slightest disturbance reaching the circuit become extremely serious and are transmitted to the radio audience, unless special precautions are taken to avoid them. Interference occasioned by leakage on nearby high power lines and numerous other forms of induction must be corrected before the line can be successfully used.

Repeaters must be installed at various points along the line which raise the volume level, whereever attenuation because of the long distance over which the voice currents have travelled, requires it.

If the input of the lines were too large, it would affect neighboring circuits so that radio programs would be heard on lines used for commercial telephony; if it were too small, so much amplification would have to be used at the receiving end, that inductive interferences for neighboring telephones and power circuit would be broadcast. Consequently a balance between these two extremes must be maintained, determined upon in each individual case after careful preliminary tests simulating actual broadcasting conditions.

The actual work necessary to prepare long distance telephone lines for use in connection with radio broadcasting is indicated by the broadcast of a meeting of the National Electric Light Association. Several months ago microphones were installed in Carnegie Hall, New York, to pick up speeches by Julius Barnes, President of the United States Chamber of Commerce and vocal selections by Anna Case, Metropolitan Opera soprano. This program was broadcast through WEAF, New York, WGY, Schenectady, KDKA, Pittsburgh and KYW, Chicago. A roll call was taken by means of the telegraph system which always connects all stations and repeater points involved in the simultaneous broadcasting, and the names of no less than 65 engineers were called off which represented the personnel especially detailed to the task, of wire telephony and broadcasting. Many of these engineers were sent long distance to their various stations. They had to be on duty not only on the occasion of the program, but several days and nights ahead for preliminary tests. Naturally such preparations cause the expense of disorganization of schedules and the calling of substitutes.

At the point where the program is being picked up, microphones are installed, special wires are run from the microphone to an amplifying equipment, operated by an amplifier expert whose task is to see that the telephone lines are furnished with the program at the proper volume level. Two complete sets of wire lines are always prepared so that should one through some emergency become noisy, the other circuit may be resorted to without interruption. Telegraph operators are stationed at each broadcasting station as well as amplifier and repeater points so that any difficulty detected by the monitoring engineers may be at once corrected.

There is a vast difference in the handling of a commercial call and the preparation of long distance lines in connection with radio broadcasting. A wider appreciation of these problems and of the magnitude of the task involved would make clear why more broadcasting with the aid of telephone lines is not undertaken.

DO YOU WANT

To build up and strengthen that tired and overworked arm?

Do You Want to Revitalize those Jaded, Strained Nerves?

The Candler System, quickly brings about COMPLETE CO-ORDINATION of ALL the faculties used in telegraphing so that Sending and Receiving is made EASY for any operator, regardless of age.

THE CANDLER SYSTEM

Course of High-Speed Telegraphing

This course has helped 30,000 operators—it will help YOU 13th year. A great benefit to every operator says noted Telegraph Editor. Results are guaranteed. Money refunded if it doesn't do what we claim. *Read these letters.*

"Your system is a wonderful thing for operators, and I wish more of them could understand it. It has brought new life to me. Can send with both right and left hand—something I could never do before, and can copy 75% better than I ever could. Would have been out of the business had it not been for your system." G. P. Baker, Vice Pres. Gilliam Bros. & Co., Inc., 46 Chamberlaine Bldg., Norfolk, Va.

"Gained 30 lbs. in weight—Grip restored to the best. Sending and Receiving improved 60%. I advise every operator who is run down, nervous or suffering from loss of grip to take your system."

Roy W. Nichols, Plymouth, Kansas

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Send for my NEW 50-Page Booklet "Scientific Telegraphing"

Just off the press. Contains some startling facts, and full particulars of this marvelous system. A postcard will bring you a copy FREE. Write NOW!

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Possibilities of the Radio As opposed to Cables Discussed by Western Union Engineer

E. R. Shute, Member of American Institute of Electrical Engineers, Operating Engineer of Western Union Telegraph Company, New York, Tells of Radio.

RADIO has caught the popular fancy. The story of its development and growth reads like a fairy tale, for it has come into being practically over night. A broadcast receiver has become almost as much of a household necessity as the old kitchen stove. One epoch-making invention has followed another in such rapid succession that to the casual observer it would seem that the radio had supplanted, or was about to supplant, all other forms of communication.

To a student of communication, however, the radio is not an omnipotent "cure-all." It has a clearly defined field, which does not encroach on the field of any other means of communication. No one who has had any experience with the problems of interference between broadcast stations would suggest the substitution of radio for telegraph or telephone wires over land. It would be impossible of operation and uneconomic.

For communication between moving stations, or between a moving station and a fixed station,—as between two ships, or between a ship and shore,—or for communication to a large number of stations simultaneously, that is, broadcasting, the radio has no competitor.

There remains to be considered communication between continents. In this field, there is a rather clearly defined separation between the realm of the radio and that of the ocean cables. Unfortunately, detailed figures showing the first costs, annual charges, and operating costs, are not available; but from such figures as are available it appears that the first cost of radio and cable are about equal, the annual charges on a cable are less than on the equivalent radio plant; and the operating costs are lower on the cable than for the radio.

Since this is the case, where, then, is the field of the radio in intercontinental communication? It is between points where there is not enough traffic to justify the laying of a cable. Laying a cable makes possible communication between only two points, that is, the terminals of the cable. The erection of a possible direct communication with all the radio stations within its range. A country having a comparatively small amount of traffic for, say, four other countries, cannot justify laying four cables, one to each of these countries. The cost would be prohibitive. But it can justify the erection of one radio station which can reach all of these countries. Schedules can be arranged so that, for example, during the first quarter hour, it works with station A, during the second with station B, etc. These stations in turn work with each other so that all are operated on a reasonably economic basis. However, when the traffic between any two of these countries grows to such an extent that practically the full time of their stations is required to handle it, the lower costs, higher carrying capacity, and more dependable operation of a cable, make the continued use of the radio undesirable.

The advocates of the radio as a "cure-all," may say, "But what of future developments in the art? Won't they materially change this condition?" No one can say what the future holds, but recent developments in the cable art have been at almost as rapid a pace as those in the radio art. In fact, it could be said that the developments within the past five years in the cable art far surpass the developments in trans-oceanic radio.

Rotary repeaters have been used for some time on the Western Union Telegraph Company's land-line Printing Telegraph circuits. A development of these rotary repeaters, called the Cable Regenerator, has made it possible to connect together, without any repeater losses, any combination of land-lines and cables to make a thorough circuit. With this regenerator, it is possible to set up a through circuit from San Francisco to Paris, using land-lines from San Francisco to New York, cable from New York to Valentia, Ireland, cable and land-lines from Valentia to London, and cable and land lines from London to Paris.

The syphon recorder, which records the received cable signals in a wavy line on a narrow strip of paper, has for a long time been the standard method of reception. The translation of these signals on long cables required highly trained operators who, in common with most mortals, were not one-hundred per cent accurate. Within the past year the Western Union cable engineers put into operation a cable printer, which prints the received message in Roman characters so that anyone can read it, at a speed in excess of the ability of the most skilled syphon recorder operator and with mechanical accuracy.

The latest, and possibly the most far-reaching, development is the new type of ocean cable which is now being manufactured for use between New York and the Azores. This cable, which is known as the "permalloy" cable, will have a capacity in the neighborhood of 2500 letters per minute. The fastest trans-Atlantic cable now in use has a speed of 350 letters per minute. This great increase in speed is accomplished by continuously "loading" the cable somewhat on the order of the Pupin coil loading of telephone lines.

All of these developments still further increase the lead the cable has over the radio, and with other developments almost completed, make it reasonably safe to say that the cable will remain supreme in trans-Atlantic communication for quite a long time in the future.

Broadcasting

ROBERT, age six, was being put to bed after listening to the bed time story, and as usual he said his prayers, but finished them in this manner: " . . . and God bless papa, and God bless mamma. This is Bobby signing off—good night."

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The Teletype on the Great Western Railroad of England

THE Teletype has been introduced on the Great Western system experimentally with the object of expediting the transmission of telegrams. It is in operation between Paddington and Birmingham. For dealing with railway telegrams single needle and sounder telegraph circuits have hereto been employed. These circuits require trained operators to work them. The speed of the two latter seldom exceeds 20 words per minute. The Teletype is a machine which enables telegrams transmitted from a keyboard at one end of the circuit to be received printed at the other end on a narrow ribbon of paper. The keyboard is practically identical with the standard keyboard of a typewriter, so that anyone with a knowledge of ordinary typing can quickly become an efficient operator on the Teletype. The speed is about 40 words per minute, an automatic check stopping it when this number is exceeded.

The apparatus installed between Paddington and Birmingham is duplex, which means that Paddington can send messages to Birmingham at the same time that Birmingham is sending messages to Paddington. When duplex working is in progress four operators are engaged, two at each end for sending and receiving. The receiving operators have simply to cut off the gummed strip as it comes out and paste it on the telegraph forms. The Teletype can be super-imposed on a pair of wires used for a telephone circuit in precisely the same way as a sounder circuit is superimposed. It is possible for more than one receiving set to be installed on a circuit, so that messages can be transmitted to more than one place simultaneously. There is thus the possibility of the Teletype being useful in connection with train-control working. Another distinct advantage is that the received messages are clearly printed, so that they can easily be read. The chief points in favor of the Teletype are that trained telegraph operators are not required to work it and that double the speed of an ordinary sounder circuit can be attained, as by depressing the letter keys of the alphabet at the sending end a reproduction of the letters is obtained at the receiving end, whereas on ordinary single needle or sounder circuits the letters have to be formed in the Morse code. As the letters in the alphabet number 26, to form these on ordinary telegraph circuits in Morse code represents eighty-two operations, so that the difference in speed, comparing ordinary telegraph operating with the Teletype, is as 26 to 82.

There is one disadvantage which may be mentioned: it is sometimes necessary for more than one copy of a telegram to be made, for instance, when it is addressed to more than one person, and in the ordinary way these are made by means of carbon paper. Only one copy comes out on the Teletype, so that when more than one is required copies have to be made. At present these are being made by means of a gelatine and roller, and this has met the requirement. It would appear, therefore, that the Teletype will be a means of materially increasing the capacity of overburdened telegraph circuits without the expense of additional wires or additional operating staff.

—*The Railway Gazette, London.*

Honoring Professor Morse.

MANY former telegraphers who are now occupying important places in other lines of endeavor, together with a number of those now in active service residing in New York City and vicinity desire to do honor to the memory and achievements of Professor Samuel F. B. Morse, the "Father of the Telegraph," whose genius has wrought such marvels in communication which may well include not only the Morse telegraph, but the radio telegraph and radio telephone as well.

For many years the achievements of this great American have been almost forgotten, and as we are approaching the centenary of his great invention, we may well at this time pause and pay tribute to his memory.

The 133rd anniversary of his birthday will occur on Sunday, April 27, and a dinner in his honor will be held at Hotel Biltmore, New York. at 7 P. M., Monday, April 28.

As a further observance of this anniversary, arrangements will be made for the decoration of his monument in Greenwood Cemetery and in Central Park.

Institute of Radio Engineers

THE recent election of the Institute of Radio Engineers resulted in the following being elected to serve throughout the year 1924: J. H. Morecroft, president; J. H. Dellinger, vice-president; W. F. Hubley, treasurer, and to the Board of Managers, A. H. Grebe and H. W. Nichols. Other members of the Board of Managers are: Melville Eastham, Edward Bennett, L. A. Hazeltine, Donald McNicol and Lloyd Espenschied.

Dr. A. N. Goldsmith was reappointed secretary for the coming year.

Robinson's Manual of Radio Telegraphy and Telephony

THE fifth revised edition of the Manual of Radio Telegraphy and Telephony for the use of naval electricians, by Captain S. S. Robinson, United States Navy, is now ready for delivery. The manual presents, for the use of student operators and others, the elementary principles of the art of radio telegraphy and telephony, together with descriptions of apparatus commonly used. This volume is the fifth revision of the volume originally written by Lieutenant (now Rear Admiral) S. S. Robinson, United States Navy, in 1907. The book measures six inches wide by nine and a half inches in length, and contains 308 pages with illustrations. The price of this work is $3.00 and copies may be obtained from Telegraph and Telephone Age, 253 Broadway, New York.

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EDITORIAL COMMENT

Ownership Statement

STATEMENT of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of TELEGRAPH AND TELEPHONE AGE, published 1st and 16th days, each month, at New York, N. Y., for April 1, 1924.

State of New York,
County of New York,
ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared John B. Taltavall, who, having been duly sworn according to law, deposes and says that he is the publisher of THE TELEGRAPH AND TELEPHONE AGE, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit.

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, John B. Taltavall, 253 Broadway, New York.

Editor, John B. Taltavall, 253 Broadway, New York.

Managing Editor, none.

Business Managers, none.

2. That the owner is:

John B. Taltavall, 253 Broadway, New York.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities, are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JOHN B. TALTAVALL, Publisher.

Sworn to and subscribed before me this 19th day of March, 1924.

[SEAL] JOSEPH R. FRITH.

(My commission expires March 30, 1924).

Notary Public, Kings County, No. 114.
Certificate filed in New York County, No. 260.
Kings County Register's No. 4116.
New York County Register's No. 4231.

The Growth of Wireless

THE English Marconi Company of London, England, is a parent company and has nearly forty subsidiaries, located in all parts of the world, feeding orders for wireless apparatus, and instruments, traffic, tolls, license fees, dividends and royalties of all kinds into the treasury of the parent company, this company, due to the opposition of the British Posmaster General has not and is not making anywheres near the headway that the free and unhampered RADIO CORPORATION OF AMERICA has made that just comes out with its Annual Report of a Gross Earning of $26,394,789 for the year 1923.

A little over two years ago the United States barely had one broadcasting station. Now it has 548 Broadcasting Stations, 3,000,000 Radio Receiving sets in the country, 10,000,000 listeners-in day after day, and night after night, 1,000,000 people directly or indirectly connected with or employed in the radio wireless industry, 3,000 manufacturers of radio supplies, 1,000 wholesale distributors and jobbers of radio, 25,000 retail dealers of radio of all kind, 1,000 newspapers which carry radio programs and radio news columns, 1,000 weeklies with radio sections, 30 radio perioidcals, 50 magazines carrying radio sections, 250 popular and technical books written on radio, 7 radio trade papers circularizing among the jobbers and manufacturers only, $1,000,000,000 estimated expenditures by the American public during the year 1923 for radio material of all descriptions and make, by the radio amateurs, radio enthusiasts and radio fans.

Employees Build Many Homes

THE home building organization of the Chicago employees of the Western Electric Company is planning to finance three-quarters of a million dollars worth of building during 1924. The Hawthorne Club Savings, Building and Loan Association gives an indication of the home building tendency of the works personnel in the success of its latest stock sale.

By subscribing to 6,000 new shares, members ot the association have brought their total active capitalization up to a maturity value of $3,500,000 representing 35,000 shares.

A new campaign is now under way to increase the number of shares to 40,000, an expansion of capital which will increase the income to $10,000 a week. The association now has outstanding loans amounting to $528,000 from which additional income is received. This, in conjunction with two other series of stock to be issued later this year will bring the total 1924 income well beyond the $750,000 mark.

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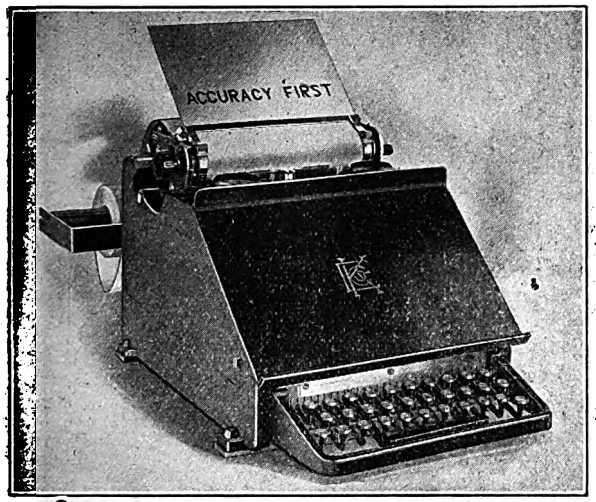
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER



AN ENTIRE SYSTEM
IN
ONE SIMPLE TYPEWRITER UNIT
Not Merely A New Design.
A Revolutionary Change.
The Unit that proves in on lightly loaded circuits.

Kleinschmidt Electric Co.
LONG ISLAND CITY, NEW YORK

HALL SWITCH & SIGNAL CO.

Garwood, N. J. Chicago

MANUFACTURERS OF THE

GILL SELECTOR

THE UNIVERSAL SELECTOR
FOR
TELEGRAPH AND TELEPHONE

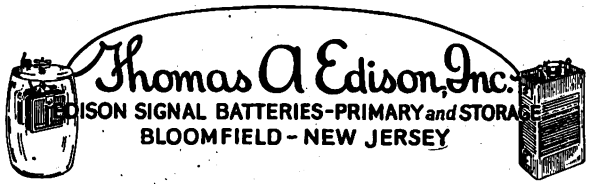
Economical Telephone and Telegraph Service with Edison Primary Batteries

Whether used on closed or open circuits, the Edison Primary Battery is superior to the dry cell in long life and endurance.

When telephone receivers are off the hook, and the discharge is constant, Edison Primary Batteries always maintain a uniform voltage which produces clearer and more efficient transmission. They are economical in intermittent service for the reason that no action takes place when the circuit is open.

Edison Primary Batteries will give more dependable service at a lower cost than any other form of battery energy.

They possess a distinct and enviable reputation for constant, reliable, and economical operation.



ST. LOUIS
Railway Exchange Bldg.

CHICAGO
Peoples Gas Bldg.

SAN FRANCISCO
Balboa Bldg.

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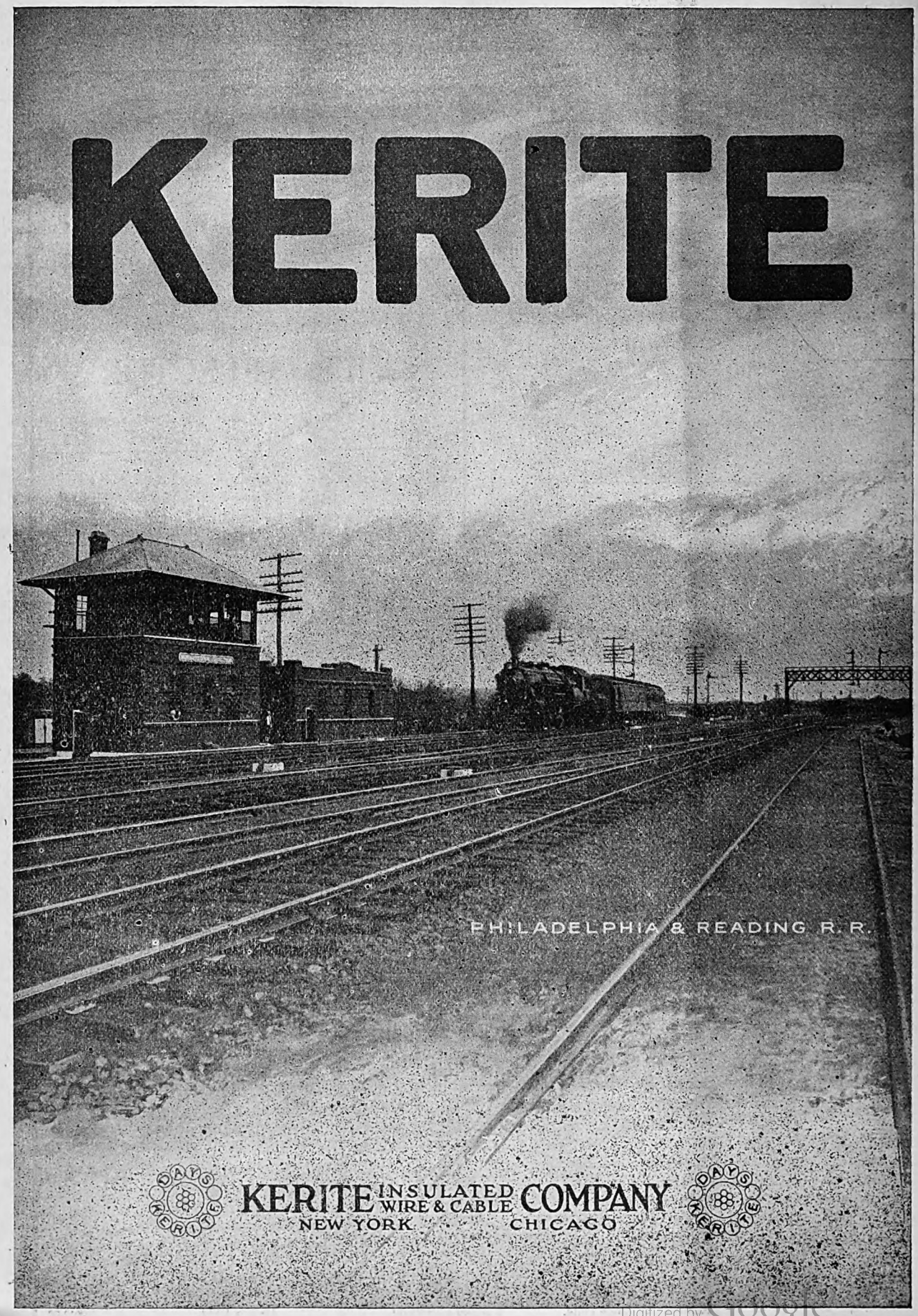

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

A MEETING of Sub-Committee "A-1—Creosoted Poles and Pole Line Material of Sub-Committee "A"—Construction and Maintenance of Pole Lines, Wires and Cables, was held at 30 Vesey Street, New York City, on April 14.

A MEETING of Sub-Committee "K"—Installation and Maintenance of Committee No. 2—Construction and Maintenance—Inside Plant, will be held in the office of the American Railway Association, Transportation Building, Seventeenth and H Streets, N. W., Washington, D. C., on April 29th and 30th.

PATRICK E. CROWLEY has been elected president of the New York Central and Hudson River Railroad to succeed the late A. H. Smith, who was killed in Central Park, New York, having been thrown from his horse.

The Late Prentiss Warner Drew

PRENTISS WARNER DREW, who died on March 25th, as announced in the April 1st issue, was born on July 8, 1843 at Burlington Vt. When he was fifteen years of age the family moved to Quincy, Ill., where his father was a hat manufacturer.

Mr. Drew took pleasure in recounting this incident of his boyhood:

In 1885 while the great struggle between Lincoln and Douglas for the senatorship was in progress he went to one of the meetings in a nearby town selling Lincoln badges. After the speeches he was standing in the hall when Lincoln came down the stairs. The boy mustered up courage to say to him, "I would like to shake hands with the man who is going to Congress," and held out his hand. Lincoln's face lighted up with a smile that made his rugged countenance look handsome. Taking the boy's hand and placing his other broad palm on Drew's head he said, "The man who wants to go, you mean, my boy." Prentiss attended Quincy College for two years when the Civil War came and the College was closed.

He then became a messenger boy and studied telegraphy at the Quincy office of the Illinois & Mississippi Telegraph Company. He carried to U. S. Grant the notice telling him of his promotion to Brigadier General. He did much war-telegraph service. In a few months he was appointed agent of a railroad at West Quincy, Mo.

In 1886 he became a train dispatcher at Hannibal, Mo. He there married Anna E. Evatt of Quincy who stood by his side through fifty-seven years of married life. In 1869 when twenty-six years old, Prentiss Drew was appointed supertintendent of telegraph of the Hannibal and St. Joseph Railroad. Three years later the work of operating superintendent of the Eastern division was added to his duties. By this time three sons had come to the young couple. Change of management caused an upheaval but misfortune proved to be a blessing, for a staunch friend, O. S. Lyford, offered him a place on the Chicago and Eastern Illinois Railroad at Chicago. He accepted and in 1878 moved his family to the great city with the accompaniment of many misgivings.

In a short time he was made superintendent of telegraph of this road.

Mr. Drew moved to Englewood, then a prairie settlement in 1880, building a home on 67th Street in 1882. The family then consisted of six sons. For many happy busy years they lived and worked together, doing service in First Methodist Church of Englewood, a social and religious center of importance to the community.

In 1883 Prentiss Drew was elected Secretary of the association of Railway Telegraph Superintendents of the United States, which position he held for thirty-three years. His enthusiastic work helped to establish the Association as a factor in telegraphic development, though in the early years this was a slow and trying process. He was one of a few men who made the association a success in the early years.

Heavy duties placed upon him as superintendent of transportation of the Eastern Illinois Railroad in the eighties proved well nigh fatal to him. Inadequate facilities of the road with heavy gains in traffic made a bad situation. Fortunately in 1891 an opportunity came to enter a new line, as President of a stone company and he made the venture.

It was not long, however, before the fascination of the telegraph service claimed him again. On the Northern Pacific, the Wisconsin Central, Soo Line, he served as superintendent of telegraph from 1893 to 1918 when he retired at the age of seventy-five. At the annual conventions of the superintendents he was the modest, genial manager. Mrs. Drew was with him at thirty of these thirty-three meetings and gained distinction among the women guests as a leader.

Looking back over his long life nothing pleased him more than the consciousness of having done his bit to promote christian ethics among men in church and civic affairs. As a church trustee, secretary, Sunday School teacher, President of Lake Township Sunday School Association and in other ways he wrought diligently. For three years he was President of the Law and Order League of Englewood which waged a warfare against the encroachment of saloons on the prohibition districts. The law was sustained repeatedly in court and many liquor men punished.

Prentiss Drew had a large circle of friends throughout his life because of his personal qualities. He was an ideal husband, father, citizen and friend; considerate, unselfish, genial and sincere. He was a great reader, well informed, capable of discussing a wide range of subjects, fond of out of doors, golfing, camping and fishing; a welcome guest, a good teller of stories, a big hearted man. No one ever heard him use a word of profanity or tell a

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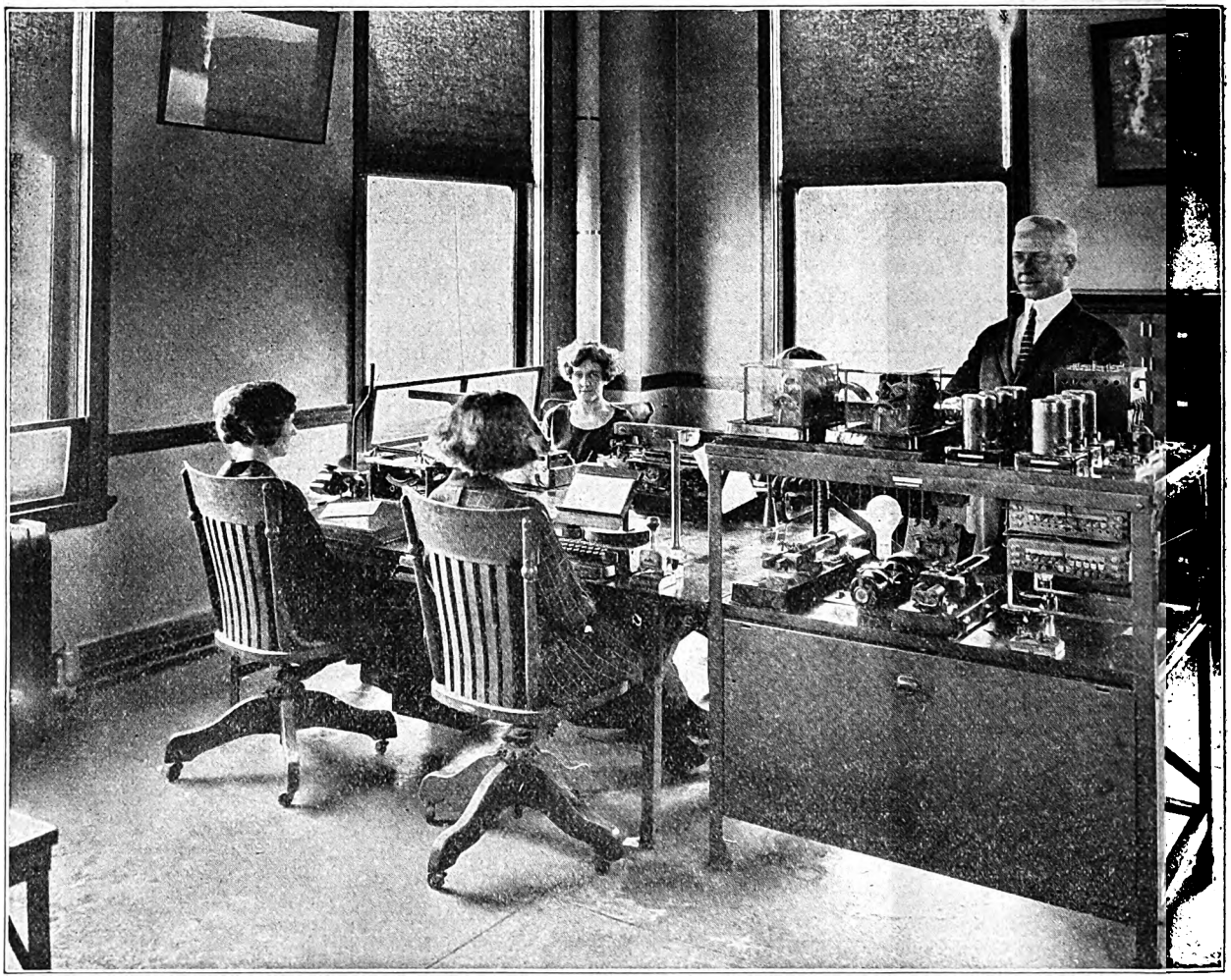
A Corner of a Modern Telegraph Office.



This shows a **MORKRUM MULTIPLEX** in the Omaha office of the **UNION PACIFIC SYSTEM.**

This two channel **MULTIPLEX** operates over a telephone simplex 1,000 miles long, between Omaha and Salt Lake, at a speed of 54 words per minute per channel.

There are two repeaters in this circuit and the **UNION PACIFIC** states that the **MORKRUM MULTIPLEX** handles their heavy traffic satisfactorily with no interference with telephone transmission.

In addition to the Omaha-Salt Lake circuit **(MORKRUM MULTIPLEX)**, the **UNION PACIFIC SYSTEM** has in operation, **MORKRUM DUPLEX** circuits between Omaha-Cheyenne, Omaha-Chicago, Omaha-Denver and Omaha-Kansas City. These printer circuits have been in operation from three to seven years and are still rendering efficient and satisfactory service.

MORKRUM

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vulgar story. In short he was a good fellow, yet alway a christian gentleman.

The Golden Wedding Celebration of this pair was celebrated in 1916. Mr. Drew's 80th birthday occurred last July and the six sons and other relatives and friends were present at a lawn party which will linger long in memory.

Anna E. Drew, his wife, was an ideal helpmate and to her high character and wise management must be credited in due measure the successful upbringing of this large family. The twenty-one grandchildren and three great grandchildren were a delight to the dear old man in his last years.

Prentiss Drew led a life of honor and usefulness. He was rich in those virtues which never fade and he left a valued heritage to those who follow him.

Radio Corporation of America

GENERAL J. G. HARBORD, president, was kept busy the past few weeks as guest and speaker at several important functions.

On April 3rd, General Harbord told a noon day meeting of boys in the financial district at the New York Chamber of Commerce of the importance of "team work."

General Harbord was one of the principal speakers at a dinner of the officers of the 77th Division Association at the Hotel Astor on April 5th, and on April 9th, he addressed the University Club of Brooklyn.

Vice-president and General Manager David Sarnoff will address the Chicago Association of Commerce on April 23rd.

E. J. Nally, Managing Director of Foreign Relations, left for Paris on the Steamship Paris on April 5th.

How to Get a Raise

GET to work and forget the clock.

To be paid more, do more than you are paid for.

Look to your job, but also look beyond it.

Command attention because of the attention you concentrate on your job.

Read everything you can buy, beg or borrow relative to your business.

Give your employer the benefit of your brains even if you think you are being paid only for the work of your hands.

Get ready for your promotion before you see the remotest possibility of being promoted.

Fall in love with your work, and if you can't find it in your heart to do so, get another job.—*The Shield.*

Post Office's Four and a half Millions Profit

ALTHOUGH the income of the English Post Office for the year ending March 31, was seven millions less than during the previous twelve months, there was a surplus over expenditure of £4,450,245.

The income of the Post Office was £58,351,242, towards which postal business contributed £35,830,562, telegraph business £5,492,096, and telephone business £13,818,969.

The King's Wireless

A MAGNIFICENT cabinet wireless set, constructed by the British Broadcasting Company, has been installed at Buckingham Palace.

The set is unique in many features. There is no visible aerial, earth wire or even frame receiver.

The set has two high-frequency valves, one detecting, and three resistance capacity note magnifiers, and it includes a loud speaker and four headphones.

A small drawer beneath pulls open to reveal a plugboard for the 'phones. The set is tuned to receive 2LO (London) only.

The Lord Chamberlain has written on behalf of the King to the British Broadcasting Company saying his Majesty realizes the set will enable him to keep in closer touch with the marvelous progress of wireless science.

A Hustled Wedding

A WIRELESS operator Eric Alban Belt of New York City had three days leave in London and living up to the standard of celerity characteristic of his country he "hustled some." Within twenty-four hours of his leave, he decided he would get married and with a Hounslow girl, he rushed off to the American Consul and to Dr. Commons, London, for a license. Armed with the license he pelted off to Hounslow, where the knot was tied just as the clock struck three. His bride was Miss Alice Mason of Hounslow. The honeymoon was spent at a Strand Hotel, and then the bridegroom dashed off to Tilbury, to catch his ship. Mrs. Felt proposes to book her passage to New York, where she will rejoin her husband. The couple first met four years ago, but have only seen each other at long intervals. "I hardly realize I am married," the bride declared to a newspaper representative. "It was all so sudden."

The Rev. A. M. Bashford, vicar of Holy Trinity, Hounslow, said it was the quickest hustle he had ever experienced. "The couple landed on my doorstep at half past two, and asked me to marry them. I told them it would have to be done before three o'clock, and in the following half hour, they went off and purchased the ring and I pronounced them man and wife, just as the Church clock struck three."

Another Snake Story

WITH the aid of a pneumatic drill and a quantity of explosives, 247 rattlesnakes, some of extraordinary size, were recently killed by a party of Baird, Texas, citizens. They were assisted by employees of the Postal Telegraph Cable Company, which is constructing a line through Callahan County. The latter donated use of the drill.

How to Make the Highways Safe

GIVE permission to the telegraph companies to work pole lines along them.

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PERSONAL

R. RAVEN HART, whose personal letter addressed to A. H. Morse of Montreal, was published in these columns recently, is now telegraph superintendent of the Ferrocarril Transandino, Los Andes, Chile.

POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice president and general manager, delivered an address on the early history and development of the telegraph before the Rotary Club of New Rochelle, N. Y., on April 9. Mr. Reynolds' talk was illustrated with moving pictures showing the laying of the new cable and the method of making repairs.

J. F. Skirrow, vice president and chief engineer, is making an inspection of lines and equipment in the state of Florida.

E. P. Tully, vice president, commercial department, was a recent visitor to Philadelphia.

C. A. Comstock, vice president, is leaving for a trip through the west where the question of facilities to take care of the growing demands and expansion of business will be carefully looked into at all of the large centers.

The company has recently moved its office at Des Moines, Iowa, to larger and more commodious quarters in the Equitable Life Insurance Building. In refitting the office only the latest and most approved type of equipment has been installed and the office is a thoroughly up-to-date and representative one.

The Company has also recently moved its office at Canton, Ohio, being now located at 224 Third Street, in the center of the business district.

JOHN HECK, manager, Wilkes-Barre, Pa. has resigned after a service of twenty-one years, to engage in the jewelry business.

Lexington, Ky.

MANAGER C. H. WAGGENER of Lexington, Ky., has established and organized a club known as the "Lexington Telegraph-Telephone Age Club" which meets every Thursday night. All railroad telephone and telegraph employees of good character are eligible. There are now thirty-one members, the object of this club is to discuss railroad, telephone and telegraph topics, personal efficiency, constructive thinking, fundamentals in selling service and business administration. The Club unanimously adopted the following code of ethics drawn up by Manager Waggener:

"We will respect all religious creeds and shall not interfere with any man's honest political convictions.

We shall always be square with those who trust us and always fair with those who do not.

We want to live as long as we can be useful to our country, our community and to those who love us.

We firmly believe that selfish interest defeats self-interest—that our permanent profits and lasting satisfaction in success will only come through capable dependable *SERVICE*.

We will not exchange our friendships for all the currency in this country.

We are unspeakably grateful to our Maker for each and every day that we are permitted to live that several will really miss us when we take the long, long trail.

Finally we want so to live that our Mother's will smile down and still call us her Boys."

As manager, Mr. Waggener has won the Class "A" Postal Banner for the third time, February 29th which ended another Contest. The Lexington office under Mr. Waggener has never been below second in all contests, and in the Good Will Election contest Lexington was the System Winner in its class by a good majority. Manager Waggener says: "Our Ideals are high, we believe that the best a man can be in this world is to be A MAN. We will not permit associations, habits or surroundings to prevent us from remaining *Men*. We are healthy and keep fit, energetic and know how to fight to win, we are on the job at all times.

Commercial Pacific Cable Co.

HENRY F. HARRINGTON, aged sixty-two years formerly a superintendent of this Company, who has been living in retirement from active service, died on April 8th. Mr. Harrington had been associated with the company since its inception in 1902, and served at several of its stations. He had a good deal to do with the laying of the underground cables in San Francisco and the equipment of the Company's stations when the Commercial Pacific Cable was first laid. Mr. Harrington was born at Arichat, Nova Scotia, on September 27th, 1861.

Prior to joining the Commercial Pacific Company's service he was employed by the Commercial Cable Company in a technical capacity from 1884 when that company opened for business. He did pioneer technical work in the Commercial Cable service as an assistant to the late Charles Cuttriss, many years chief engineer of the company, and he also acted as special engineer in charge of the manufacture and laying of the Commercial Company's trans-Atlantic cable in 1894.

THE Commercial Cable Company is issuing posters which read: "Forty years of Service." Commercial Cables Postal Telegraph. 1884-1924.

SAMUEL FINLEY BREESE MORSE, the inventor of the telegraph, was born at Breed's Hill, Charlestown, Mass., on April 27th, 1791. The house, over the front door of which a suitable tablet has been placed commemorating the event, still stands. Mr. Morse died on April 2nd, 1872, in his house located at West 22nd Street. The remains were buried in Greenwood Cemetery, Brooklyn, N. Y., and a suitable monument was placed over the grave.

Ever Happen to You?

IT was a dark night and the motorist was lost. Presently he saw a sign on a post. With great difficulty he climbed a telegraph pole, struck a match and read, "Wet Paint."

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THE WESTERN UNION TELEGRAPH CO.

Western Union Cables Handle Longest Message Ever Sent Without Relays.

RECORDS for cable communication were broken in two ways on April 7th, when the Western Union Telegraph Company transmitted the 44,000 words of the Dawes Committee's report from Paris. Officials of the Company said it was the longest individual message ever sent by any means of wire communication, either cable or domestic, and—what they regarded as more important—the first instance in the history of cable communication when a message was sent directly from a foreign point of transmission into the establishment of the recipient without any break or relay. Telegraph officials were jubilant over the success of their attempt with the new method and said the achievement was without a parallel in the annals of Ocean Cable Telegraphy.

Until recent years, such a voluminous communication filed at Paris could only reach New York City by a most circuitous route. Paris, for example would transmit the entire message to London. London in turn would re-transmit it to Valentia, Ireland, from thence to Hearts Content, Newfoundland. Here again it would be relayed to North Sydney, Nova Scotia, re-transmitted afresh from North Sydney to New York City and eventually retransmitted from the Cable Office in this City to the offices of the Associated Press in Madison Avenue over their private telegraph wires. This operation would involve a complete transmission of the entire message at all of the intermediate points affected.

With the adoption of the regenerating repeaters, however, now used exclusively by the Western Union Cable Company, the necessity for these several handlings at the intermediate stations no longer exists. By the installation of this repeater, Paris can now establish instantaneous contact with New York at all times and send cable messages direct to this country thereby eliminating the vexatious delays that accrued under the old method of operation.

This remarkable invention is further enhanced by what is known as the "Overland Recorder System" of operating, another basic improvement over cable apparatus of other days. While the regenerating repeater enables Paris to establish and maintain instantaneous contact with New York, the Over land Recorder makes it possible to further extend the sphere of direct communication to include any city in the United States and made it possible for Paris to send direct to the offices of the Associated Press as was illustrated in this demonstration.

Except for test messages sent on April 5th to satisfy the experts that they could transmit the Dawes report direct to the office of the Associated Press when it came into their hands, it had never been used before in the way it was employed on April 7th.

Officials of the Company stated that a few years ago it would not have been thought possible to transmit a message of this kind anywhere except directly into the office of the cable company, where the peculiarily sensitive instruments needed for the task could be operated under the most favorable conditions.

The amount of labor and time saved by the new process is recognizable from the Company's description of the route the message would have taken under the old conditions and the number of times it would have to be relayed or repeated.

The effect of the new system, as described by Company officials was to link all this system into one route and send directly from one end in Paris to the other end in the Associated Press office. Under the old system there would not have been enough power to do that. The new system gives the necessary power and there was no trouble in getting the signals.

The signals are caught on a siphon recorder at the receiving end. They come in as a zigzag blue line with the dots on one side of a neutral line and the dashes on the other recorded on a narrow band of paper which unwinds at the rate of three yards a minute.

An operator sits by the recording tape and as it unwinds reads the cable signals and translates them into English, transcribing them on a typewriter as they are received. The typewriter is equipped with wax stencils from which as many copies of the message as are desired are made.

Three cables were used in the transmission and a fourth was in readiness in case it was needed. The method was to break the message into three sections, the sending of each of which was begun and carried on simultaneously.

The regenerating cable repeaters and the Overland Siphon Recorder apparatus which made this performance possible was developed by the engineers of the Western Union Telegraph Company and are considered two of the most progressive steps in the history of submarine telegraphy during the past sixty years.

A. E. POWELL, former general plant manager (Ocean Cables), was tendered a farewell dinner by his staff upon the occasion of his resignation on Monday Evening, March 31. The affair was held at Whyte's Rathskeller, Fulton Street, the room being attractively decorated in red, white and blue, featuring an American and a British Flag hanging side by side. Short talks were given by several members of the staff followed by the presentation of a suitably engraved loving cup, and a handsome silver mounted fountain pen. In his closing remarks Mr. Powell reviewed briefly his latter years with the company, and touched upon several items of interest to those present.

G. H. Ridge. who succeeds Mr. Powell as general plant manager (Ocean Cables), acted as Toastmaster. Mr. Powell has resigned to go with the Commercial Cable Company, New York.

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WILLIAM E. LOCKWOOD, early night testing and regulating chief, at Syracuse, N. Y., died at his home in that city on March 24.

Mr. Lockwood was widely known in telegraph circles throughout Northern and Central New York. He has been connected with the local offices since 1886, as operator, bookkeeper, traffic chief and testing and regulating chief.

His remains were taken to Mechanicsville, N. Y., his early home, and buried in the family plot.

JAMES H. NISSLEY of Columbus, Ohio, has been appointed assistant manager of the Akron, Ohio, office of this company.

C. G. ANDERSON, formerly of J. P. Edwards staff, New York, has been appointed chief operator at Providence, R. I.

Troy, N. Y.; Bridgeport, Conn., and Atlantic City, N. J. have been made functional offices.

WILLIAM C. MARKWITZ, a trusted employee of this company, was sentenced February 7th, in the County Court of Champaign County, Ill. after an indictment by the grand jury on the charge of operating a confidence game, to serve an indeterminate term of one to ten years in the State Penitentiary. Markwith was manager for the company at Champaign, Ill., and while serving in that capacity wrote out and cashed money transfer drafts aggregating approximately $1,400.00. In addition he appropriated for his own use about $200.00 from the money transfer cash drawer. His pleasing personality and the excellent record he made in the World War had won the confidence of his immediate superiors, and discovery of his peculations came as a great surprise to them. Markwitz had become heavily involved in debt which fact was given as the reason for the embezzlement.

THE company has started remodeling its offices at 527 N. Eighth street, Sheboygan, Wis. Architect W. C. Week, in charge of the work, has started a crew tearing up the old floor preparatory to replacing it with tile.

The building occupied by the Western Union Telegraph Company is owned by the Bowler Realty company, but is held under a ten-year lease. The interior and front are to be entirely remodeled and equipped with new furniture, telegraph apparatus, and office supplies.

The present partition in the rear of the office is to be torn out and set back, providing much more office room, making it about twice the size it is at present. A separate room is to be built for messenger boys, and another to be used as a locker room. The main office, when completed, will be 73 feet from front to rear. The floors will be tiled throughout.

Manager E. L. Clark says he expects the work to be completed in about three weeks.

THE Company will be installed in its new home at First and Topeka, Wichita, Kansas, by June 1, it has been announced. The building is being completed rapidly, the floors are being built and electricians are installing the telegraph and telephone equipment.

The company's offices will be in the northwest portion of the first floor. The rooms will have terazza floors and will be finished in oak and marble. Entirely new office equipment will be installed.

There also will be storage rooms and private offices on the first floor, as well as a rest room for the messengers, with shower bath and a small library. On the second floor will be the rooms for telephone and telegraph operators. The floors in both these rooms are of wood blocks, but in the other rooms they are terazza. The equipment in both rooms is of the latest type.

In the telephone room will be received messages by telephone to be sent out over the wires and from which communication may also be had with patrons. A pneumatic tube from the second floor will send messages to the offices on the first floor, from which they will be delivered.

On the second floor are large, well-equipped rest rooms for both men and women operators.

The new Western Union Building, built by Collins Brothers of Kansas City, is 60x140 feet, two stories, with buff terra cotta exterior and is thoroughly fireproof. It cost about $75,000.

ONE hundred and ninety thousand dollars as rent will be paid by this company to Mrs. Anna Leonard in the coming 15 years for the use of the present Sherman, Clay & Co. building, owned by Mrs. Leonard, at W808-810 Sprague Avenue, opposite the Davenport hotel, at Spokane, Wash.

Anne Flaherty

EVERYBODY in the business section of Portland, Oregon, knows Anne Flaherty. Some of the people who know her could not even tell you her name, but all of them can identify her if you say to them "Why I mean that girl Western Union messenger."

Girls are not too many in the Western Union service, and none of those who preceded Anne in the business remained with the Western Union Telegraph Company for more than a year. Anne, on the contrary, has started her fifth year of continuous service, and in the course of those five years she probably runs hundreds of thousands of errands for men and women who have their offices within a four or five blocks radius of Monument Square.

There are two reasons why people can be easily identified. One is because some of them are always crabby and cross. An unpleasant word, an ungracious act, live long in memory. The second reason is because certain people are always cheerful. Anne belongs to the latter group. It is her smile, and her cheery "Yes, ma'am" or "No, sir" as the case may be that endear her to the Western Union's customers.

Anne is an out-of-doorsy sort of girl. She rides horseback, and she loves to swim; in fact is a long distance swimmer of parts, having made swims a mile or more in length. Probably it is the fact that she likes to stay out doors so much that influenced her in her choice of vocation when she left school after she had completed her course at St. Dominics and decided to try her hand at a being self-supporting young woman. Anne was fourteen years of

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age then. She is eighteen years now; going on nineteen, and she has made a pretty good shift to take care of Anne Flaherty.

She likes the messenger work. Storms and chill winds have no terrors for her. And because she is happy and willing she never appears to be tired. If walking gets to be a bore once in a while nobody guesses it.

Anne loves the Western Union Telegraph Company too well to want to get a job with any other company, but she has a proper ambition to improve herself, and so she is studying hard at night school taking up business English and typewriting with a hope of eventually becoming annexed to the main office of the Company.

At present her station is the Fidelity Building, from which she sallies forth to pick up messages about the business section, and brings them back to be relayed down to the main office by the operator who is in charge there.

OBITUARY

CHARLES E. MCKIM, aged sixty-seven years, of 1274 North Negley Avenue, Pittsburgh, a veteran employee of the Pennsylvania Railroad, later a financier, and at the time of his death a well-known real estate broker, died on April 4th, in the Mercy Hospital, where he was taken the day previous to his death following a stroke of apoplexy suffered in the office of Dr. C. C. Moyer, Keenan Building. Mr. McKim had offices in the Keystone Building.

Mr. McKim was born in Portland, Ohio, and was educated in the public schools of Martins Ferry, Ohio. He entered the railroad service in 1871 as a telegraph operator for the Cleveland and Pittsburgh Railroad at Mingo Junction, Ohio, now part of the Wheeling division of the Pennsylvania. He served in various capacities until 1899, when he was appointed superintendent of telegraph of Lines West of Pittsburgh.

Resigning from the Pennsylvania in 1904, Mr. McKim became the general superintendent of the Chicago, Rock Island and Pacific Railroad. He was with that company for several years. Later he was connected with the Louisville and Nashville Railroad at Louisville, Ky. He left the service of that company and went to Albany, N. Y., where for a time he was with the Delaware and Hudson Railroad.

Wedding Ceremony Fails to Keep Announcer Silent for Even an Hour

MILTON J. CROSS, better known to hundreds of thousands of radio listeners throughout the country as "AJN," one of the most popular announcers of Broadcast Central—stations WJZ and WJY was married on April 6th all unbeknowest to the listeners-in, for the ceremony took place early enough for him to be before the microphone of WJY at 2:30 o'clock to introduce the broadcast artists just as though nothing unusual had happened.

The wedding, which took place at 1 o'clock at Old St. Paul's Church, marks a milestone in a romance which was started three years ago when Lillian Ellegood Fowler of 124 West 94th Street, Manhattan, at that time the assistant to Dr. Carl, organ-master of the Old First Presbyterian Church, met Milton J. Cross, who was visiting soloist at that church. The first meeting occurred almost three years to a day before the wedding, for Mr. Cross sang at the First Church during the Easter Week services in 1921 and met Miss Fowler during that week.

Mr. Cross has been a familiar voice to the radio fans since the fall of 1922, when he made his debut as an announcer from station WJZ in Newark. When WJZ moved to its present home in the Aeolian Building, New York City, Cross was heard from both station WJZ and its twin station WJY. He is a singer of considerable reputation in church work in Manhattan and Brooklyn, and once a week he sings over the radio during the Estey Organ Recitals, announcing himself as "your announcer AJN."

The engagement, which has been a secret from even Mr. Cross' associates at Broadcast Central, since Christmas, was rather suddenly terminated by the quiet ceremony and Mr. and Mrs. Cross have decided to defer the honeymoon until late summer. Consequently the radio audience will continue to hear "AJN" announcing the programs from WJZ and WJY during the spring months just as though nothing had happened. The couple have taken an apartment in Brooklyn, which will undoubtedly be one of the leading musical salons of the borough before long.

Strike of Marconi Operators in London

RADIO HOUSE, London, from where long distance circuits are operated to New York, Glace Bay, Paris (France), Madrid, Barcelona, Berne and Vienna, was the scene of a dramatic strike on Friday, March 21, when at 4 P. M., the whole of the operators "downed tools" and the wireless service going out of London ceased to function. It is understood that this drastic action was only decided upon after many unsuccessful attempts to secure an interview with the management which however promptly followed the men's action and work was resumed at 8 P. M. the same day. The men's representatives, headed by E. R. Tuck, secretary of the Association of Wireless Telegraphers, met the management again the following day, when the operators claim was admitted to be justified and £4 per month additional to married men and £2 per month to single men is to be paid forthwith dating from January 1, 1924.

Letters of a Radio-Engineer to His Son, by John Mills, is the title of a 262-page book, fully illustrated, which measures 5½ inches wide by 8¼ inches high. This work is not likely to go out of date for the reason that while definite directions are all through it, it gives an account of the fundamental principles of radio communication and shows how this discovery is a natural development of science. It ends with a hint of what radio communication may come to mean. The price of this work is $2.00 per copy and orders may be sent to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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Dot Sherris, 8 Years Old, Hailed As World's Youngest Telegrapher

A LONG dash—two dots close together—two dots further apart—now one short dash.

The dash and the two dots stand for "D" in the Morse code. The two further apart dots make "O," and the short dash is "T". That spells Dot in Morse.

Doesn't mean much in your young life, of course, but Dot happens to be the "sending signature" of eight-year-old Dot Sherris, who claims she is the youngest girl telegrapher in the American continent—maybe in the whole wide world.

Dot's daddy is an American, but he's rather a long way from home just now. If you are curious to know where Dot lives, take a map of North America. Hunt up the province of Western Canada which lies right next the Rocky Mountains, that's Alberta. Follow the railway line from East to West, running through Edmonton.

Next run your finger up a rather straggly railway line that runs North and West from Edmonton, in the general direction of the Arctic ocean. Three hundred miles along this line takes you to the little town of Peace River. Next, take the river valley trail twenty-six miles South and East. Make a dot with your pencil there, and say, "How d'ye do, Miss Dot Sherris," for your pencil dot has now met the Dot of this story. America's champion girl telegrapher.

Bill Sherris, Dot's dad, used to pound telegraph keys for a living twenty years ago on the old Southern Pacific railway. He was generally considered about as good an operator as they come.

Bill went to Canada, headed North, and settled down where your pencil dot is, on the map, at a place called Little Prairie. He kept store, became postmaster, and also telegraph operator for the line owned by the Canadian government, which passed his place.

Small wonder, of course, that little Dot, whose name is really Dorothy, should get quite excited when as a babe in arms, she listened to that interminable "dot-dash-dot" of the telegraph ticker, as it flashed its messages from and to places on the edge of civilization.

At two years of age, Dot became literary, and learned her A. B. C.'s. Six months later, stories in the primer were pie to Dot. There wasn't any school nearer than twenty-six miles, so Dot's mother did the teaching.

Then the Alberta government started sending out mail order courses in public school work, to kiddies way off where there weren't any schools. More pie for Dot, who sailed blithely through grade after grade, leaving in her wake, trails of red ink "excellents." Now she is studying for her "leaving school" examination, though she's never yet been to school.

When she was about five years old, the typewriter on dad's desk, right by the telegraph board, attracted her attention. Dot just took it in her stride, as it were, and then turned to the mystery that lay behind that ticking telegraph buzzer.

At eight she could write the Morse code alphabet as easily as, at two, she had swallowed up her A. B. C.". See her then, perched on the tall stool at her dad's elbow, all attention to take down the letters which came through from the outside world.

Then came a day when Dot earned her right to be classed as a real telegraph operator. On that day, her father being absent, Dot was left temporarily alone. Neighbors dashed in, terribly excited.

"Where's your dad, Dot? There's been a murder—we want him to wire to Peace River for the police!"

"Dad out," answered Dot, quite composed, "but I'll send the message, if you wish."

"Why child, you couldn't send a message over that thing!" gasped all the neighbors at once. But Dot sat down and sent it; three hundred or more words; and she signed it Dot Sherris, and it flashed over the wires, waking up a whole continent to the fact that bloody murder stalked abroad in that little far-off Western Canadian community.

Dot is over nine years old now. Nobody ever questions her ability to send messages, these days. She takes turn and turn about with her dad, receiving or sending messages. Over four hundred miles of shining copper wire, from Edmonton to Grande Prairie, telegraph operators know the signature of Dot Sherris, youngest girl operator on the American continent.

Her education is proceeding. Her dad is teaching her shorthand and real typewriting, and also, she's studying the Phillips' code, which is the code used by the Canada-wide press agency, Associated Press, to send messages to the many papers it serves throughout Canada.

One of these days, Dot will march into telegraph headquarters and ask for a full-fledged operator's job. That is, unless she doesn't get too enthused over radio in the meantime, and become a radio operator instead. She's very keen on radio already

She's a nice, quiet sort of girl, is Dot. Not a bit precocious or spoiled, but gentle and unassuming, just as if she didn't know she was, may be, a world's champion telegrapher.

"Dot's a dandy little cook, too," was the way her mother concluded the interview that gives little Dot Sherris her place in the halls of fame.—*St. Paul Pioneer Press.*

New York Telegraphers' Aid Society

THE annual election of the New York Telegraphers' Aid Society was held in Room 1229, 24 Walker Street, New York, on March 25th. The following were elected: President, Charles J. Lemaire; vice-president, D. J. Condon; Treasurer, T. M. Brennan; financial secretary, C. A. Kilfoyle; recording secretary, F. J. Sheridan. Executive committee, E. D. Pitt, R. L. Francis, Wm. R. Klitz and John J. Keefe; auditors, F. J. Nurnberg, J. F. E. Hopkins and H. M. Heffner.

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CONTENTS

PAGE

Operators on the Pennsylvania Railroad in 1867. By J. M. Alter..... 196
Telegraph and Telephone Life Insurance Association..... 197
The Origin of "30" and "O. K." Dutch Plan North American Cable..... 198
The First Typewriter in Peoria. Printed Proceedings of the Old Time Telegraphers' and Historical Association. A Little Story of What Was and What Am. By Josh McKosh. Tibet Accessible by Telegraph..... 199
Restoration of Penn Post Jeopardized by Loss of Telegrams. By Britannicus of London. Destroyers to Sound for Cable to Alaska. Radio Circular Revised 200
Longest Through Telephone Circuit in World Links Chicago with Los Angeles and the Great Northwest. By R. T. Barrett. Annual Report of the American District Telegraph Company..... 201
David Sarnoff on Broadcasting..... 202
Facts About Electricity..... 204
Messenger Training. Associated Press Wiremen's Club Gathers. If You Aren't There You Needn't Answer..... 205
The Canadian Pacific Railway Company's Telegraph Messenger Boys, Montreal. Message Girdles the Earth in Eighty Seconds. Canadian National Telegraphs 206
Retires on Pension. By Old Farmer Lawton..... 207
Editorial Comment. Marconi Appeal Dismissed. Breaks World's Speed Record. Alaska Weather..... 208
The Railroad. Telegraph and Telephone Section of the American Railway Association 211
All America Cables. Radio Corporation of America. Death of George L. Wiley. Federal Telegraph Company. Armed Men Hold up Office and Get $2.00 212
Personal. Postal Telegraph-Cable Company. Commercial Cable Company. 214
Western Union Telegraph Company..... 215
Rum-Runners Suspected of Cutting American Cable. Captain Sparks to the Rescue 216
Broadcasting and the Entertainment Industry. EMF Electrical Year Book. 217
First Radio Circus Broadcasted..... 218

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Operators on the Pennsylvania Railroad in 1867

By J. M. ALTER.

I was born in Harrisburg, Pa., in August, 1847. During the term of Joseph Ritner as Governor, who married a great-aunt of mine and my father was appointed Collector of the Pennsylvania Canal during his administration and that accounts for my birthplace.

I entered the office of Superintendent Samuel D. Young of the Pennsylvania Railroad, to learn the telegraphic business, in May, 1864. I worked over the Middle Division until 1868 when I was appointed to a position in the Post Office Department and resigned and took my office on January 1st, 1869. I soon found out that "to the victor belongs the spoils," for in May, 1871, my head dropped into the political basket to make room for one of a different political stripe. H. A. Clute was Superintendent of Western Union Telegraph Company in Harrisburg, and offered me a position as manager of the Clearfield, Pa., office. It was a small town of 2700 inhabitants, but the center of the coal and lumber business and a busy office; salary $60, which was very good for those days as the best on Middle Division were then only getting $50, and some only $30. I took charge on June 1st and remained there until December, with exception of two weeks which I spent at Bellefonte while a friend was getting married. On December 18th Mr. Clute wrote me that he had sent a man to relieve me and to report to him. He had an application from a Philadelphia firm who wanted an operator who could do office work as well and Mr. Clute wanted me to have it as it would pay $75. Private wire. He went down with me and saw me installed and a year later I was getting $100, and later $115. Then the William Butcher Company failed and was merged with the Baldwin Locomotive Works and I was with them until 1895, when I went into business for myself and continued at it until 1904. In 1903 I made a business trip to Silverton, Colorado, having been elected a director in January of the Mining Company. Mr. Charles Huntington, the general baggage agent of the Chicago and Alton was president and of course he furnished me transportation for the trip. I have been the secretary of the company since 1903.

I was so infatuated with the climate here in the two weeks that I was in the State that I sold out my business in 1904 and moved to Denver. We did not like that city for a residence, so in 1905 moved to Colorado Springs and have been here since.

In 1906 I was elected to the Vestry of the Grace Episcopal Church and have been the parish secretary every since. I keep the books and look after the financial end. The church was built in 1873 and is now in the business district, next door to the Federal building.

Next month we will begin the erection of a new church that will cost around $225,000. The beauty of it is that we have the money all pledged before a pick is struck. Lots of millionaires in the church.

A Boston firm are the architects and the church will be the finest in the West. The above amount does not include the chimes, the latter having been donated.

I can do no better than send you a roster of the whole gang in 1867 when I was a regular fan. It may not interest you, but Mr. Allison gets great pleasure in looking over it and comparing notes. The Printers' Home is only a short distance from my residence and the tram cars pass my house to the Home and he often drops in for a chat.

He misses home ties, but the Printers' Home is a home indeed. They have their own herd of Holsteins and have good milk and butter and everything in the market that they do not raise. But they must be in by ten o'clock without a permit. Among so many strangers, Allison gets lonesome and says he comes here to get some personality. I never knew him in the old days, but knew his father, when I was in politics. I met my wife in Baltimore, although her ancestral home was at Castleton-on-the-Hudson, I having met her at the Centennial in 1876.

I knew Eckert, Bates, Carnegie, but not Strauss or Wilson.

THE TELEGRAPHIC OPERATORS ON THE LINE OF THE PENNSYLVANIA IN 1867.

Philadelphia Division.

Chief Operator—J. W. Crouse, Philadelphia.

Operators—H. C. McKeever, President's Office; Miss M. E. Bull, Wash. St. Wharf; M. M. Beach, Greenwich Pt.; Miss G. D. Russell, 18th and Market St.; Miss S. P. Hemphill, 15th and Market St.; Samuel Clairborne, Arsenal Office; H. L. Cooper, West Phila.; E. S. Phelps, West Phila.; E. S. Gove, West Phila.; Miss K. V. Eberly, West Phila.; W. Gove, West Phila.; E. H. Johnson, West Phila.; W. Coun, West Phila.; E. Beck, West Phila.; H. Brady, West Phila.; E. G. Reese, Mantua; W. L. Colville, Mantua; M. Hart, Overbrook; J. N. Marshall, White Hall; C. A. Colfelt, White Hall; Miss A. M. Bloomer, Eagle; Miss M. E. Hauseman, Paoli; L. C. Grabill, Paoli; Samuel Martin, West Chester Intersection; W. Richards, Dowingtown; J. McDade, Dowingtown; Miss M. E. Ferree, Coatesville; Lewis Espembach, Parksburg; C. Wilson, Parksburg; Latta Laverty, Gap; R. C. Laverty, Leamon Place; H. Fondersmith, Leamon Place; H. F. Albright, Lancaster; C. W. McCaskey; Lancaster; H. M. Shaffner, Columbia; F. Fenstermacher, Columbia; H. Martin, Columbia; Mrs. M. F. Sultzbach, Marietta; W. Orendorf, Marietta; B. G. Galbraith, Bainbridge; E. H. Eyde, Bainbridge; L. S. Stape, Landsville; S. J. Owens, Mount Joy; C. M. Root, Mount Joy; H. T. Shultz, Elizabethtown; Miss R. S. Stehman, Middletown; Z. C. Hardy, Middletown; C. B. Conn, Harrisburg Pass Station; A. Dennis, Harrisburg Pass. Station, G. A. Cobb, Harrisburg Pass. Station.

MIDDLE DIVISION.

Chief Operator—A. R. Kiefer, Harrisburg.

Asst. Chief Operator—R. L. Head, Harrisburg.

J. A. Burkholder, Harrisburg; J. J. Burkholder, Harrisburg; Miss M. G. Humes, Harrisburg; Miss E. Cogley, Harrisburg; Miss Laura Humes, Harris-

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burg; G. M. Eitemiller (extra operator), Harrisburg W. Jones, (freight office), Harrisburg; Miss L. Sarch (shops), Harrisburg; J. Cantwell, Harrisburg; W. G. Wilson (stock yards), Harrisburg; Miss Mollie Kerr, Rockville; S. T. Trimmer, Rockville; M. J. Stoner, West End Susquehanna Bridge; C. B. Johnson, West End Susquehanna Bridge; Miss M. J. McKee, Marysville; George B. Stoner, Marysville; Miss Kate Rohm, Duncannon; N. H. Van Fassen, Duncannon, Miss Sallie M. Kerr, Newport; C. L. Bretz, Newport; Miss Tillie Hutchinson, Thompsontown; Miss Mollie Dean, Thompsontown; T. S. Johnson, Mifflin; H. H. Hamilton, Mifflin; Miss Mollie B. Cogley, Lewistown; H. M. Strickler, Lewistown; John Rhinehart, McVeytown; John Moran, McVeytown; S. M. Bleakney, Newton Hamilton; T. Z. Van Zant, Newton Hamilton; Miss J. J. Crane, Mapleton; E. L. Maize, Mapleton; C. C. Irwin, Bridgeport; J. M. Alter, Bridgeport; D. McCahan, Huntingdon; Miss Mollie C. Stewart, Huntingdon; L. J. Koch, Huntingdon; A. E. Bayles, Sprice Creek; J. N. McCaskey, Sprice Creek; J. M. Albright, Tyrone; J. S. Rissley, Tyrone.

WESTERN DIVISION.
Chief Operator—John Suter.

Miss Marie Hogan, Duquesne Depot; Alfred A. Askins Pass. Dept., Pittsburgh; Thomas H. Nichols, Pass. Dept., Pittsburgh; Thomas E. Reilly, Outer Depot, Pittsburgh; Alex. H. White, Outer Depot, Pittsburgh; Miss Lizzie E. Hogan, Outer Depot, Pittsburgh; James Hamilton, Outer Depot Pittsburgh; Warren Gillilen, East Liberty; J. R. Funk, East Liberty; Miss Belle E. Wallace; Brinton; Miss Fanny A. Smith, Brinton; Charles H. Fleming, Irwin; Iden B. Dalby, Irwin; R .G. Ford, Penn.; William H. Wilson, Penn.; Mrs. Jane D. Foster, Greensburg; Jas. E. Lane, Greensburg; Ridgely S. Beckwith, Latrobe; Joseph Wagoner, Derry; David J. Simpson, Derry; Theo. S. Fleming, Blairsville Intersection; Laiseur N. Singley, Blairsville Intersection; John H. Bretz, New Florence; Hugh M. Goewy, New Florence; Merrick Munson, Johnstown, H. W. Storey, Conemaugh; Wm. H. Rosensteel, Conemaugh; Miss Lizzie Cullen, Wilmore; Miss Emma Bryon, Wilmore; Robert H. Brown, Cresson; Wm. D. Seibert, Gallitzin; Isaac A. Weaver, Gallitzin, Sylv. W. Getty, Gallitzin; David Shook, Gallitzin; Miss Flora A. Egan, Hollidaysburg.

Altoona—W. McCormick, manager; Charles McCormick, Otto Snyder, J. McCoy, M. Reeves, William Simpson.

JAMES MONROE ALTER, now Parish Secretary, Grace Church House, Colorado Springs, Colo., is an old time telegrapher.

Wireless in Every Room

ONE of the big hotels in Berlin is fitting out all its rooms, to the number of some hundreds with wireless receiving sets.

Telegraph and Telephone Life Insurance Association

AT the Annual Meeting of the Telegraph and Telephone Life Insurance Association, held Wednesday, March 12, President T. W. Carroll, in reviewing the work of the year referred particularly to the need of a more active organization in connection with the building up of the Third Division. He pointed out that that division was organized on sound scientific principles and to the limit of its certificates $2500 is safe insurance.

He referred feelingly to the splendid work performed by earnest men in the early days of the Association, in the building up of what is now known as the First Division. Its principal aims however, seem to have been to keep the cost down as low as possible. Because of this the assessments for many years were too low, nor was the reserve fund built up sufficiently large to meet the inevitable increase in the average age of the membership.

Referring to the Third Division, Mr. Carroll said:

"I believe that the Third Division in its organization has overcome the faults which lay in the path of the First Division, but to successfully carry on the work of the Third Division, it is necessary that the By-laws be amended in order that proper help be provided for the carrying on of the work.

The clerk of the Association has his hands full in taking care of the voluminous details involved in the keeping of the records of the Association, and to my mind the time has come for the employment of a paid Executive, one who should devote his entire time to the affairs of the Association, and conduct the Association on a business basis. People are no longer willing to devote their spare time, and few of us have time to spare from our telegraph duties to the work of Associations similar to ours, and we are confronted with competition of companies and Associations who pay liberal compensation to its agents and for its management. Therefore, it seems to me that if we are to progress and be alive we should so amend the By-laws as to provide for paid supervision and proper compensation to our agents. We cannot stand still. We must go forward. We have an excellent plan and it seems to me that all that is necessary for success is to place the plan in the hands of active workers. To this end I would suggest that a Committee be appointed to amend the By-laws so as to provide the necessary authority for the carrying out of the work in the manner which I have outlined, and that the plan may be quickly started I would suggest that when this meeting adjourns, we adjourn to meet on the call of the Chair at a special meeting to consider and act upon the report of the Committee on the revision of the By-laws."

"EVERYBODY is wondering how liars keep in practice during the winter months, when there is no fishing and little golf," says a writer. Wireless is providing an excellent substitute.

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The Origin of "30" and "O. K."

EVERY once in awhile someone writes to us asking how the symbols "30" and "O. K." originated. The proper way, we presume, to answer these inquiries is to reprint what we have previously said on the subject.

"The origin of the word 'thirty' used in newspaper and telegraph offices to designate the close of report for the day, has never been satisfactorily explained, although it has been used as long as newspaper men can remember. There are several interesting versions of the original source of this symbol, a few of which are here given: A compositor of some notoriety in his locality dropped dead while seated at his case. The last types he had set were the figures '30.' A correspondent in Brooklyn for a New York City newspaper in the time before the telegraph or telephone was in use had a contract to furnish a certain amount of copy daily, which he sent across the river by ferry. To let the editor know when his report had ended for the day the correspondnt agreed to furnish thirty sheets of copy each twenty-four hours. An old editor in New York named G. W. Thurtee for years always marked his final sheet before going to press with his name 'Thurtee.' From this, it is said, evolved '30,' which has since been universally employed."

As long ago as May, 1895, George E. Allen had the following reference to the telegraphic "thirty" in the Utica, N. Y., Press:

"I attended a funeral the other day where there was a lovely flower piece with the figures '30' in the center. The deceased had been familiar all his life with that signal, having been connected with telegraph or newspaper business for nearly thirty years; and yet I doubt if he or any who contributed to the flower piece knew or dreamed how thirty come to mean anything, especially finis or the end. As a part in telegraph history I will explain how this signal, which has come to mean so much, had its origin. Like a great many other expressions, it was started accidentially, as it were. In the infancy of the telegraph, business dispatches were sent paid or collect, many of them abbreviated in telegraphing, and all newspaper dispatches were not only abbreviated, but sent collect. There were no news agencies then, as now, and papers had friends in all towns, who were authorized to send them dispatches to be called for. Every new beginner in the art of telegraphy was given a book of abbreviations and signals, which he had to commit to memory and practice till he became expert in their use. Among these signals that of "30' was found and it meant 'collect pay at the other end.' Whether a news dispatch or common business message, if not prepaid, the signal "30" was attached. As all press dispatches were paid for where received, they all had thirty at the end. So when news agencies began their work the signal was retained, for they were still paid for where received. This signal has come in these days to be a universal finis to all press dispatches, private, special and general, and a secondary meaning, or perhaps better, a legandary meaning attaches itself as 'the end,' and is a proper and beautiful expression of the finis of a telegraph operator or any other person. It well may be a signal to the spiritual dispatch of a human soul to the great center of rewards, and as a notice to estimate its value when receive and 'collect pay at the other end.'"

THE ORIGIN OF THE SYMBOL "O. K."

"O. K." as all the world knows now, the sign means "All correct." It probably originated from a humorous spelling of these words "all correct" as "oll korrect." It is now in universal use in the business world, meaning to pass, to certify, to indorse, as to "O.K." a bill, etc. When and where the "O.K." was first used no one can say, beyond the fact that it had its origin in the United States.

TELEGRAPH AND TELEPHONE AGE records show that the origin of the symbol "O.K." is a subject which has often been brought up for discussion. James D. Reid, who died in 1901, and who during his lifetime was often affectionately spoken of as the "Father of the Telegraph," having associated himself with Professor Morse in 1845, gave the following account as his understanding of the first use of these characters:

"There is a little obscurity about the first introduction into literature of the character O.K. They originated, it is believed, in the answer of a Southern postmaster to a communication from Washington to which he replied "Oll Korect," and which caused much amusement at the time, as the communication has some relation to the retention or loss of his head. This was in 1839, or early in 1840. In the Maine campaign of 1840 the Democrats of Portland arranged with the captain of the Boston steamer to place the letters 'O.K.' on the wheel house of his boat if the elections were going all right for the party, which many interpreted 'Out of Kole.'

"Its first use on a commercial telegraph line was in January, 1846, on the line of the Magnetic Telegraph Company, of which I was superintendent, and was as follows: "To prevent all doubt of the reception of messages, no message will be regarded as received by the office to which it has been transmitted until the signal O.K. has been received acknowledging its reception. The same signal was used on the Government experimental line in connection with the repetition three times of the letters i. i. i. i. i. i. O. K. The signal 'O.K." soon became universal."

Dutch Plan North American Cable

PERMISSION has been asked of the Portuguese Government to lay a cable from Emden to North America, via Fayal, one of the Portuguese islands in the Azores, by the Dutch Atlantische Telegrafin and Gessellschaft, according to an agency dispatch from Lisbon.

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The First Typewriter in Peoria

EDITOR—Have read the articles in your issues of January 16th and April 1st.

During the winter of 1889 and 1890 R. C. Baker, now with the American District Telegraph Company, was copying the night press report at Peoria with a No. 2 Remington. Late in 1890 he was promoted to day wire chief and had to copy the pony report. At times I would give him a "Short," and during that period I learned to use the typewriter.

On March 7, 1893, I was transferred to Ottawa, Ill., as manager. On April 1st the coal miners' strike was called, resulting in riots and fires in the mining towns, two or three deputy sheriffs were killed. Ottawa Journal took bulletins from various offices every hour. The editor of the Journal loaned me a typewriter to take the bulletins on and I started receiving all messages as well. To my surprise one day the following message came, "Understand you are using a typewriter to receive messages with, this we consider unsafe, discontinue the practice at once and advise—F. H. Tubbs, superintendent." Upon receipt of my reply and the copy of the above telegram which I had received on the typewriter, which I sent to Mr. Tubbs, W. J. Lloyd, then assistant superintendent, came down to Ottawa, and asked me to use the typewriter on Chicago. He instantly saw the possibilities, and told me to keep on using it. A few days later Mr. Tubbs wrote me to come to Chicago and demonstrate that the typewriter was the only thing to use for copying messages.

Mr. Lloyd and John Fitzpatrick will both recall the incident. Mary Fitzpatrick, who was working the Chicago end of the local was at that time very chummy with "John" and no doubt told him about me using the typewriter. They were married later.

Yours truly,
T. H. ANDERSON, Peoria, Ill.

Printed Proceedings of the Old Time Telegraphers' and Historical Association

THE Printed Proceedings of the Old Time Telegraphers' and Historical Association, which met at Denver, Colo., on September 6th, 7th and 8th, 1923, has just been distributed by the secretary, Thomas E. Fleming, 195 Broadway, New York. There are seventy-two pages to the book and its measures six and a half inches in width by nine and three-quarter inches in length. It is printed on coated paper, and is fully illustrated. The illustrations consist of G. F. Batty, W. C. Black, James C. Burger, Alex. B. Cowan, Mrs. A. B. Cowan, Denver Badge, H. L. Esch, Thomas E. Fleming, Four Aces (group), A. A. Gargan, Walter C. Humstone, Humstone Message (group), C. J. Ince, W. J. Lloyd, Lookout Mountain Views, Frederick A. Mohr, Ben S. Read, J. F. Reade, Three Roses (group), E. Burke Spencer and Mrs. Ralph Van Tine. The book is a valuable addition to the old timers' library and it will be appreciated by all who receive a copy.

A Little Story of What Was and What Am

BY JOSH MCKOSH

BACK yonder in St. Paul, Minnesota, in the year of 1891 and 1892, when Chas. Kelly was chief telegrapher for the Western Union Telegraph Company and Lou Wise, was punching the C. N. D's. with Buck Moore on first Chicago, J. L. Cassidy the artist, McIntyre was wire chief.

Now back to the story which I have in mind. It was during the above years, when one of the boys came walking into the St. Paul office with a typewriting machine, it was necessary for him to pass directly in front of Chief Kelly's desk. Kelly spied the machine and he right now stopped the lad and says "Where you going with that contraption? The lad said "I'm going to copy messages with it." Kelly says, no you are not and you just take that contraption right out of this office.

The writer years ago was hired out to O. C. Greene, then superintendent of telegraph for the Northern Pacific. After passing through a tryout on my receiving ability I was given a pass to Rathdrum, Idaho, boarding the train in St. Paul and in due time when the conductor came along collecting tickets he was asked how far this place was. The conductor took out a folder from his pocket and unrolled it about a yard and told the writer that it was around two thousand miles. The writer never at that time having traveled more than a hundred miles at any one sitting was in a quandry as to the nature of the place to which he had been sent. He also wondered how he was going to get back to St. Paul. It was this long trip that made a boomer out of the writer as he for years picked out long trips and during the past years has made many long jumps, but now his boomer days are over and he has settled down in a happy home in the mountains.

Tibet Accessible by Telegraph

For many years Tibet has been counted one of the most inaccessible fields in Asia. Now a telegraph line has been opened connecting Tibet with India, and the first message sent over the new line was one from the Lalai Lama to the Viceroy of India (in part) as follows

"On the occasion of connecting Lhassa with the outer world by telegraph, I tender felicitous greeting to His Majesty the King-Emperor, Your Excellency, and the Political Officer of Sikkim. We all fervently hope that the line will serve to cement the permanent bond of already existing friendship, between our countries and increase trade between us."

The viceroy replied in a like congratulatory vein. Those who have long been praying for an entrance for the Gospel into Tibet will take heart from this news. Telegraphic communication is bound to help open the country to missionary enterprise.

JAPAN, on April 8th, heard the concert broadcasted from WOR, Newark, N. J. The distance separating the two points is nine thousand miles.

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Restoration of Penny Post Jeopardized by Loss of Telegrams

By BRITANNICUS OF LONDON.

ACCORDING to the latest statistics published by the Post Office authorities, any possibility of the restoration of the penny post is extremely doubtful owing to the heavy deficit shown on the telegraphs. After fifty-two years of ownership of the Inland Telegraph system, our multitudinous magnates so firmly entrenched at St. Martins-le-Grand are as far off as ever from making the telegraphs self-supporting, yet in America where there are two private companies (The Postal Telegraph-Commercial Cable and the Western Union Telegraph Company) in keen competition, both report that they are doing the largest business in history and in proof thereof continue to pay a very satisfactory annual dividend. It may not be generally known that on every occasion when Government control of telegraphs has been urged in the United States, our Government-owned telegraph system has invariably been successfully held up as an awful example of poor management.

Arrangements for the handling of telegrams in this country astonish our visitors and is easily understood when you realize that there are only three telegraph offices in the whole of greater London that are open to accept telegrams after 8 P. M.

The question of speed looms largely in the matter and is the despair of the business community; it is absolutely a fact, as pointed out on a previous occasion in the British press, that it is quicker to send a telegram from London to Manchester via New York, than by the direct Post Office route between the two cities and this state of affairs cannot be attributed to the war.

Nearly twenty years ago, the British Post Office telegraph service to the continent was so painfully slow that every day, hundreds of telegrams for France and Germany were sent by London Stock Exchange firms over the trans-Atlantic cables to New York from where they were redirected back to Paris or Berlin as the case might be, notwithstanding that the rate per word was two shillings instead of two pence on the direct Post Office route. The Atlantic cable companies concerned did the round trip in fifteen minutes, so that the higher charge was easily met from the distinct and valuable advantage gained over competitors.

In those days the cable companies in question maintained a two-minute service between London and New York for the Stock Exchange arbitrage business; that is to say, a customer could instruct his New York house to buy a certain quantity of American railroad stock and the reply to the effect that the transaction had been completed, together with the price would be delivered in London in two minutes.

These private cable companies have lost no time in putting their house in order since the great war upheaval and are in an even better position to-day to give this marvellous service when required, but the British Post Office Telegraphs, possessing the finest engineers in the world and with unlimited means for development, instead of going ahead, get further and further behind.

Surely if the two land telegraph companies in America, in keen competition, can earn regular dividends, the British Post Office Telegraphs with a monopoly should at least be self-supporting.

Destroyers to Sound for Cable to Alaska

The destroyers Hull and Corry, the only warships in the world equipped with sonic depth finders, have been ordered to Alaskan waters by the Navy Department to survey the ocean bed and discover a practical route for laying the proposed new Government cable from Seattle to Seward, Alaska.

Congress has appropriated for something over 1,000 miles of new cable in the Alaskan system. The cable is now being manufactured in England and the cable ship Dellwood will transport it in two shiploads from England to Seattle and Alaska and lay these leads—the first one in May and the second in September of this year.

The exact location of the routes these cables will take will depend upon the results of the survey to be made by the Hull and Corry with the sonic depth finder, an instrument which determines the depth of water in the ocean by sound. The sound is sent out by the instrument, strikes the bottom and is returned to a receiver. The time elapsed from the sending out of the sound and its return measures the depth of the water.

The survey, in addition to determining the depth of water, will comprise observations for temperature of seabottom and the character of the bottom A cable route to be practical must be laid at a depth of about 1,600 fathoms. The bottom temperatures must be within certain limits which will not injure the materials of which the cable is made. There must be no tidal or current movement on the bottom, otherwise the constant abrasion would soon wear out the cable.

Radio Circular Revised

A second edition of Bureau of Standards Circular 74 on Radio Instruments and Measurements has been issued. This circular presents information regarding the more important instruments and measurements actually used in radio work and is planned to be of use to Government officers, radio engineers, etc. It makes no attempt to deal with the operation of apparatus in sending and receiving.

The first edition of this circular was issued on March 23, 1918. The new edition contains a number of corrections and revisions. Many of the matters dealt with are or have been under investigation in the laboratories of the Bureau of Standards, and are not treated in previously existing publications. The bibliography of radio publications has been considerably extended.

Copies of the new edition of Circular 74 may be obtained from Telegraph and Telephone Age, 253 Broadway, New York, at 75 cents per copy.

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Longest Through Telephone Circuit in World Links Chicago with Los Angeles and the Great Southwest

By R. T. Barrett

The longest through telephone circuit in the world, from Chicago to Los Angeles, is now serving the growing telephonic needs of the great Southwest.

It is the fact that this is a "through circuit" instead of a "built-up circuit" that makes this new development important from the service standpoint. A "thorough circuit," as its name implies, gives a permanent, through connection between the two cities at which it terminates. A "built-up circuit," on the other hand, has to be "built" for each call by switching or connecting together a number of shorter circuits between intermediate cities along the line.

When the New York-San Francisco Transcontinental Line was opened in 1915 it was operated for several months as a through circuit, 3,400 miles in length, but it was later cut in two, for operating reasons, the division being made at Chicago. Los Angeles and its surrounding territory have hitherto been reached by switching the circuit over this original Transcontinental Line to San Francisco and thence down the coast.

New facilities, recently put in service, provide a direct circuit, without the necessity of switching, from Chicago to Denver and thence to El Paso, Tucson and Phoenix to Los Angeles. The circuit is 2,937 miles long—more than 500 miles longer than the Chicago-San Francisco circuit, more than 1,200 miles longer than the New York-Havana circuit and more than 1,500 miles longer than the New York-New Orleans circuit, which have hitherto held the record for through circuit length among the "speech highways" of the world. The longest through circuits in any country of Europe are the Berlin-Essen circuit, 342 miles, and the London-Glasgow circuit, 418 miles.

The use of telephone repeaters along the line gives a normal transmission equivalent of twelve miles—that is, it is possible to talk from Chicago to Los Angeles, over this circuit, as efficiently as one could over a standard Number 19 gauge cable circuit, without loading or repeaters, twelve miles in length.

Thirteen through line repeaters are used. The use of these repeaters, an essential feature of which is a vacuum tube amplifier somewhat similar to that which is familiar to all radio enthusiasts, has aided materially in making long distance transmission possible. The farther a telephone current travels unaided, the weaker it becomes. The effect of a repeater is to catch this weakened current, amplify it many times and speed it on its way with renewed strength.

At night, when traffic is heaviest, an additional through circuit from Chicago to Los Angeles is obtained by connecting together a Chicago-Denver, a Denver-El Paso and an El Paso-Los Angeles circuit.

Although long distance lines had been built along the route of the new "Southern Transcontinental," the existing pole lines at some points were already carrying capacity loads or were otherwise unsuitable and it was necessary to construct additional pole lines to carry the new through circuits. This new construction includes a stretch of some seventy-five miles between Denver and Colorado Springs and another in New Mexico, between San Antonio and Rincon, where about ninety miles of new pole line was built.

The tourist bent on getting a comprehensive view of the varied geographic, topographic and climatic conditions in America might well follow the line of this longest through telephone circuit. He would find rough mountain country from Denver south, with the highest point of the line reached at Raton Pass, near the Colorado-New Mexico boundary, where the altitude is 7,600 feet. He would pass through long stretches of desert sand, lava beds, cactus country, arid lands reclaimed by irrigation, orange groves and cotton plantations. At Salton, just over the California border from Arizona, he would find that the line dips into a depression of 200 feet below the sea level.

Thus, from the heights to the depths, from rugged mountain lands to a perennial summer Paradise, this continent-spanning circuit winds its way, playing its important part in uniting a nation in the bonds of speech.

The circuit was put in service on December 22, 1923.

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Annual Report of the American District Telegraph Company

Edward Everett, president of the American District Telegraph Company (New Jersey), and its controlled companies, has just issued to the stockholders an annual report of the companies of which he is president. The report reads as follows:

Property Account was increased by $673,843 during the year 1923, representing new construction and betterments to the signal plant, and adjustments incident to the valuation of the Company's physical property, referred to in previous annual reports.

Plant and equipment have been maintained in good condition; the charges to operating expenses in 1923, for repairs and depreciation incurred, amounted to $1,061,884.

Compared with the results of the preceding year, the increase in total operating expenses was somewhat larger than the increase in gross operating revenue. Included in this year's operating expenses is the sum of $33,700, which was distributed among the employees pursuant to an experimental income participation plan, inaugurated during 1923.

Dividends were declared out of earnings for the year 1923, amounting to $697,506, that is, at the rate of 7% per annum on the outstanding capital stock, and the sum of $739,970 was added to surplus.

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David Sarnoff on Broadcasting

"The air will be the 'battleground' of the next Presidential campaign, and radio will play an unprecedented role in the coming election," declared David Sarnoff, vice president and general manager of the Radio Corporation of America, in an address in Chicago on April 23d, before a distinguished gathering of Chicago business men at the Chicago Association of Commerce.

"For the first time in the history of an American Presidential election, rival Presidential candidates will appeal through the forum of the air, to the American electorate. For the first time in the history of national conventions America's millions will be able to follow word by word every dramatic phase in the battle of 'favorite sons' for the distinction to be nominated for the Presidency of the United States. The enthusiasm and the tumult of a great political convention will no longer be a show for the fortunate few; for radio has made it possible for millions to follow every move in the convention hall.

"No other event would so serve to focus in the minds of the American people the great destiny and power of radio.

"The impatience evident in some quarters, at the failure, thus far, to evolve a cut and dried solution of the broadcasting problem which resolves itself in some minds into the single question 'Who Will Pay the Cost of Broadcasting,' and the panaceas offered daily as an answer to this question by many well meaning persons, follow, I am convinced, from a confused and distorted picture of the problem.

"Radio broadcasting is more than music, it is more than entertainment, it is more than news. It is a vast public forum which takes in all these elements. This must be borne in mind when one comes to consider the general problem presented by broadcasting. It is not merely who is to pay the artist or the singer or the actor for his service in broadcasting to millions of people. Radio broadcasting can and does draw upon a tremendous reservoir of public material—great political events, the pronouncements of public men, the ceremonies and functions of notable public events, popular sporting contests of national and regional interest, and a host of other happenings that constitute the life of a nation and which are not subject to the requirements of pay by the broadcast station.

"The fact of the matter is that we cannot hope to solve the economical problem presented by broadcasting, until its technical problems are in the way of solution. It is useless to consider how broadcasting might be made to pay for the services of a premier artist before a method has been evolved of broadcasting the artist's program to the greatest economic advantage. Should a famous operatic troupe or instrumentalist, hired for broadcasting purposes, make the circuit of hundreds of broadcasting stations in the United States to deliver its program to the public, or must the solution of the problem await the development of national, not merely local broadcasting facilities? From a technical standpoint, I believe the answer to the problem lies in super-broadcasting—a system of super-powered stations broadcasting with a force that could be distinctly heard in every home in the United States. I mean a national program on a national scale, to be transmitted through the vast conduits of the air from the great super-power stations. In addition, there will be the smaller stations which will provide 'home-town' programs of local interest to all in their vicinity and who may also be provided with facilities for the automatic re-broadcasting of the national programs coming from distant points. In this way, the local stations will also meet a social need particularly for those listeners having receivers of limited range.

"In seeking for an economic solution of the broadcasting problem, broadcasting on a national scale is found to be a very convincing answer. How obvious is the hopelessness of attempting to pay for the services of five hundred groups of high-grade artists broadcasting nightly from five hundred or more widely scattered stations, each serving only a limited audience. How could the small audience of such a station afford to pay for the sort of programs it really desires? Consider, on the other hand, the simplicity and feasibility of having six or a dozen groups of artists, each group broadcasting from a super-power station, to a national audience, representing the purchasing power of the radio industry. Super-power broadcasting is the technical development which is needed for the success of broadcasting; and with a satisfactory technical solution of the broadcasting problem, I am convinced there will come a sound economic solution. This solution will make unnecessary the imposition of a special tax on the radio listener by the government or anyone else or the exaction of a system of tollgate payments for the things which are broadcast through the air.

"I may be told, however, that in this I contradict a fundamental business principle—the principle that a service must be paid for by the consumer to make it economically possible. I do not believe that any solution of the broadcasting problem along the lines I sketch, would violate economic realities.

"Now, what is the situation?

"The broadcasting station, unlike the theatre or the opera, cannot offer to individual listeners, orchestra, balcony and gallery seats, in the air. It cannot charge one price for a program transmitted to the rich man's house and another price for a program sent to the poor man's cottage. And yet some equivalent method should be found whereby every listener at least, in a measure, pays for the service in proportion to what he receives. Fortunately the receiving set itself is to a considerable extent, an index, through its cost, of what and how its owner is receiving. Those who purchase the more expensive receivers get more satisfaction from programs, either in superiority of the quality of reproduction, in more satisfactory operation over greater distances, in greater selectivity, in greater ease of manipulation, and in more attractive receivers generally.

"Broadcasting, in my judgment, will be primarily

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supported by the radio industry itself and from its returns on the sale of radio apparatus. A fair method of determining the amount to be paid by each member or portion of the industry will be worked out, and this will be based on a percentage of the sales price of radio devices. Such a method is just, since it requires the expensive receiving set of greater capabilities to carry a larger share of the cost of broadcasting. And this plan is not at all a philanthropy nor a method which takes no account of economic facts. In the long run, the public that supports the broadcasting which it enjoys and each purchaser does so in proportion to the price paid for the instrument receiving through the air.

"The radio industry must remain the primary agency for the direct support of broadcasting. I do not shrink from the responsibility thus placed on the industry. The fact—and the unescapable fact—is that the radio industry has been built up and is dependent on the maintenance of a service to the public. The sooner this is recognized by the industry as a whole and the public as well, the sooner we shall arrive at the true solution of the broadcasting problem.

"A system for the support of broadcasting such as I have tried to sketch would mean that the poor man would help to maintain broadcasting according to his means and the rich man in proportion to his greater means.

"The question has been asked by well-meaning inquirers: 'What will happen when saturation of receiver sales has been reached? Who will then pay for broadcasting?' But this is an imaginary difficulty. To begin with, we are still far from a radio receiver in every home. And even when each home is provided with a radio receiver, it will have a device in daily use. No man-made structure can resist the effect of time and use and even the radio receiver is not exempt from this law of nature. So, in the natural course of events, it will become necessary to replace old receivers and parts, with new and improved ones. No one expects even such long-established businesses as the sewing machine industry to stop at some future date when everyone has a sewing machine. A domestic article, in daily use, is subject to wear and tear and does not last forever. And even sewing machines are no exception to this rule. But I do not expect a radio receiver, a vacuum tube or a dry-cell to last as long as a sewing machine.

"Adding together the returns from purchases by new customers, also by those desiring later and improved models, by those buying new receivers to take the place of old ones, and by those purchasing the necessary replacement parts, such as tubes, batteries, etc., it is clear that 'saturation' is a meaningless term in radio sales.

"I believe that there will arise other means of support of broadcasting in addition to the one I have mentioned. As the picture will become plainer, there will emerge in radio, musical foundations, operatic foundations and lecture foundations, endowed or supported by great public spirited Americans who will see in this vast instrumentality of the air, another means to become public benefactors.

"It is also a fact that many types of broadcast programs do not have to be paid for at all since they are events of public interest which would take place in any case. The combination of all of these factors gives a stable and satisfactory means for supporting the broadcasting field, as far into the future as we can reasonably be expected to see at this time.

"At the moment, broadcasting is supported by a spontaneous movement in the public, and radio industry, and many elements of the artistic and musical professions are included. The radio industry, as well as many private interests are shouldering an ever increasing burden of capital, expense and maintenance, in keeping the air full of the things which the public demands. The artist, in contributing his services, is creating a wider appreciation of his art, and obtaining some return, at least, in publicity and popularity. I do not believe that this has injured the cause of art or music. More music lovers have been created by radio broadcasting in the short space of three years, than could have been created by any other agency in several generations. In this respect, at least, facts are stronger than opinions, and the fact is that over five hundred broadcasting stations in the United States to-day are sending through the air, musical and entertainment programs contributed by local artists, who feel that they receive a measure of compensation for their services. And many an aspiring artist has had his or her first opportunity to reach a wide public audience through radio—an opportunity which might otherwise have been denied, except to those whose financial means would suffice to meet the requirements of a conventional introduction to the public through the music hall or concert stage.

"But it would be absurd, of course, to conclude from this that any responsible factor in the radio industry expects or believes that the artists should permanently contribute their services free. I would have my musical friends understand that I could not be so callous as to wish to sacrifice a profession on the alter of industry. The artist, like the laborer, must have his due reward. Far from sounding the death knell of the artist's opportunities, I believe that the radio eventually will give the artist a higher compensation, a vastly greater audience and a wider appreciation than he has heretofore enjoyed.

"In brief, the future of broadcasting, in my opinion, holds an economic solution through national super-power broadcasting. This broadcasting can be supported by the purchasers of receiving sets, through the means I have indicated. The radio industry can co-operatively work out and apply such a system and thus secure the means not only for the actual broadcast transmission from the national stations to the entire public, but also the funds to compensate in proper measure the artists

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whose genius will delight the people and to whom there will come the additional triumph and gratification of facing the greatest audience in the world —the broadcast listeners."

Facts About Electricity

QUANTITY AND TENSION OF BATTERIES.—The amount of current generated by a cell of battery depends upon the size of its plates—the tension, upon the number of cells.

Hence, a battery of forty cells, while giving forty times the electromotive force, or tension, of one cell, will furnish only the same amount or quantity of current. Each cup of battery has its own quantity, which is urged forward to the next cell, by virtue of its electromotive force. The current from the cell at the positive pole of the battery, is pushed out to the line wire, the current from the next cell taking its place—the last cell being supplied through the groundwire, from the earth. But the current from each cell, which carried forward to its neighbor, parts with its energy or electromotive force; and the current from the first cell is pushed forward to line, and thence to the ground at the further end of the line, with all the electromotive force, or energy, of all the cells.

The amount of current flowing to line, from a given battery, is regulated by the resistance of the circuit—and in this must be included the internal resistance of each cell of the battery. But, with a given total resistance, the flow of current may be increased:

1st.—By increasing the size of the cells, and thus decreasing the total resistance in the circuit; and,

2d.—By adding more cells.

If we consider only the internal resistance of the cells the addition of more cells will not increase the current.

Thus, if we have 1 cell of battery, with an internal resistance of 2 units, and an electromotive force of, say, 10, and the poles connected by a wire having practically no resistance, the proportion of current flowing to line will be 5.

$$\frac{R = 2}{E = 10} = 5.$$

Now take 5 cells.

$$\frac{E = 5 \times 10 = 50}{R = 5 \times 2 = 10} = 5.$$

The product is still 5, because the divisor and dividend are both changed in the same ratio.

But suppose the resistance of the line-wire to be 5 units, represented by r. Then with 1 cell we have.

$$\frac{E = 10}{R + r = 7} = 1.43,$$

and with 5 cells,

$$\frac{E = 50}{R + r = 15} = 333,$$

or nearly three times as much current as before.

Proportioning Battery to Line.—It will be seen, therefore, that the proper method for adapting a battery to any line, with any instruments, is to select a form of battery giving sufficient current to saturate the magnets of the relays to their maximum, and then add a sufficient number of cells, to drive it with the necessary force to produce the desired effect. The sum of the resistances of all the instruments in a circuit, should, as nearly as practicable, balance the resistance of the line-wire. In no case should they exceed the wire resistance.

"When the resistance of the coils of the electromagnet is equal to the resistance of the rest of the circuit, i. e., the conducting wire and battery, the magnetic force is a maximum."

"The application of this law to a telegraphic circuit would be to make the sum of the resistance of all the magnet-coils in circuit, equal to the resistance of the line and batteries; but as in practice the resistance of a telegraphic circuit varies, being considerably reduced by defective insulation, the total resistance of the instruments should be less than that of the line when in good condition, to attain the best results during unfavorable weather."

A safe practical rule for determining the number of cups of main battery needed, is to call the resistance of the relays equal to the line wire, and use one cup of Grove, or bichromate of potash (electropoion) or two cells of Calland or Hill battery to each 100 units resistance in the circuit.

Thus, for example: suppose a circuit of 200 miles No. 9 wire.

This will measure 20 units to the mile, or 4000 units

8 relays in circuit, 500 units each.....4000 units

Total resistance.....8000 units

For Grove or bichromate, divide by 100, and we get 80 cups battery, 40 at each terminal of the wire. For sulphate copper battery, divide by 50, and we find that we need 160 cups of battery, 80 at each end.

These figures are true only of single wires. When several wires are worked from one battery, the total amount of battey used is of course much less. The number of lines—of about equal resistance—that may be worked from the same battery varies greatly with different batteries, depending upon the chemical energy of the battery, the quantity of current evolved by it, and its liability to polarization.

This, the bichromate batteries of 80 cups, that we determined upon for our 8000 unit line, will furnish current enough for several lines of the same resistance. But as we add wires we lessen the external resistance, until, owing to the slight resistance, the action is so rapid that the battery polarizes and action ceases. Practically, not over six to eight lines can be worked from this battery.

With Grove it is different. Lines may be added to a Grove battery, with perfect safety, up to forty or fifty.

The sulphate copper batteries have too much in-

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ternal resistance to allow the addition of many wires. Three lines are worked from sulphate copper batteries having jars six inches in diameter.

In all cases, the expenditure or consumption of material in a battery is in exact proportion to the work done; that is, to the current evolved. Therefore, the expenditure of battery material, with three lines to a battery, is three times that of one line to the same battery, and there is no economy in working several lines from one battery, except in room occupied.

The disadvantage of working several lines from one battery is the interference of the circuits with each other in bad weather. Sometimes this interference is quite serious. A greater number of cells of battery than is absolutely needed to work the circuit promptly, is injurious, and in wet weather it tends to make the line work badly. Indeed, the effect of an excess of battery is often as detrimental to a line, in weather, as bad insulation, or a conducting wire of too high resistance.

To explain this, the reader will remember that the difference in resistance between the line-wire and the insulators, is the margin upon which the line is worked. If that margin is diminished by bad insulation, a portion of the current escapes to the ground. If the resistance of the line-wire is increased, the margin is again diminished, and a portion of the current escapes as before.

Now, the higher the tension of the battery-current, the more readily will it escape from the line, because the greater is its power to overcome resistance. The effect, then, upon a wet day, is the same, upon the line, whether the insulation is defective, or the battery too large.

Thus it will be seen that adding more battery to a heavy-working line, will often, in wet weather, make it work worse than before. And it will also be noted, that relays of high resistance, as they add to the resistance of the line-wire, decrease the working margin between the line and insulator resistance, and thus increase the tendency of the current to escape.

When the relays of a line, of say 200 miles, are proportioned to the line itself, that is, do not exceed the line-wire resistance, and the battery is adapted to the circuit by the rule given, if the line is well insulated, it will work well, in very bad weather, when a similar line, equipped with high resistance relays, or an excess of battery, will scarcely work at all.—Haskin's Galvanometer.

Messengers Training

THE fact that a messenger boy is seen running these days does not mean that the times have changed. In fact, the messengers are the same type of boys they always have been. But to see them running is ofttimes looked upon as a curiosity. To see one running now means that he is training for the annual track meet of the Employed Boys soon to take place.

Associated Press Wiremen's Club Gathers

Palmer C. Booth, of Quincy, Mass., was re-elected president of the Good Fellowship Club of the Associated Press Telegraphers of New England at the second annual meeting held at the Boston Yacht Club recently.

The following officers were also re-elected: Vice-president, Major L. Deane of Fitchburg; secretary-treasurer, John J. Keating, of Boston; directors, J. C. Harrington, Taunton, chairman; J. D. Kennedy, Concord, N. H.; F. C. Kindler, Manchester; N. H.; E. C. Coleman, Providence; F. G. McGuinness, Fall River; B F. Newman, Boston; C. F. Whitney, Boston. The following were added to the board of directors: J. H. McGettrick, of Burlington, Vt.; J. E. Bates, of Springfield, and R. W. Barros, of Worcester.

Edward McKernon, superintendent of the eastern division of the Associated Press, in speaking of the obligations of the service said: "The newspaper is of the greatest influence in the daily life of man. It stares them in the face in the morning, at noon and at night. Their conversation reflects the papers they read. With more than 1,300 papers in the Associated Press it is easy to see the responsibility that the service bears.

"Already the Associated Press is at work on preparations for the Presidential election next November. Washington did not know for two months that he had been elected President. Harding knew before the polls in California were closed. Now a non-partisan news service gives the country immediate word of its Chief Magistrate elected.

Other speakers were Gilbert B. Littlefield, Boston correspondent; J. M. Langley, editor of the Concord, N. H., Monitor; C. A. G. Jackson, publisher of the Brockton Times; G. H. Godbeer, editor of the Fitchburg Sentinel, and C. A. Price, Eastern division traffic chief of the Associated Press, New York.

If You Aren't There You Needn't Answer

"ARE you there?" says the Englishman when he answers the ring of his telephone, and presumably if you are not, then you don't talk.

However, the more familiar hello is used to some extent throughout the British Isles, while on the continent it is seldom used at all. The nearest approach to it perhaps is the "Allo" of the Frenchman. In Germany, Switzerland and several other countries, when a person answers the telephone he simply says "Mr. ————." giving his own name. This follows the practice being encouraged in this country.

If you are in Japan and hear the term "Moshi moshi," don't be startled. It sounds like a popular drink, but it isn't. It is simply the Japanese way of saying hello over the telephone.

In Spain the telephone salutation of the subscribers is "Oiga" meaning "I hear," to which the operator responds "Digo," which means "I say." The Italian, when called to the telephone, grasps the receiver in his hand and shouts "Pronto" over the wire, while in Sweden the usual salutation is "Hallo."

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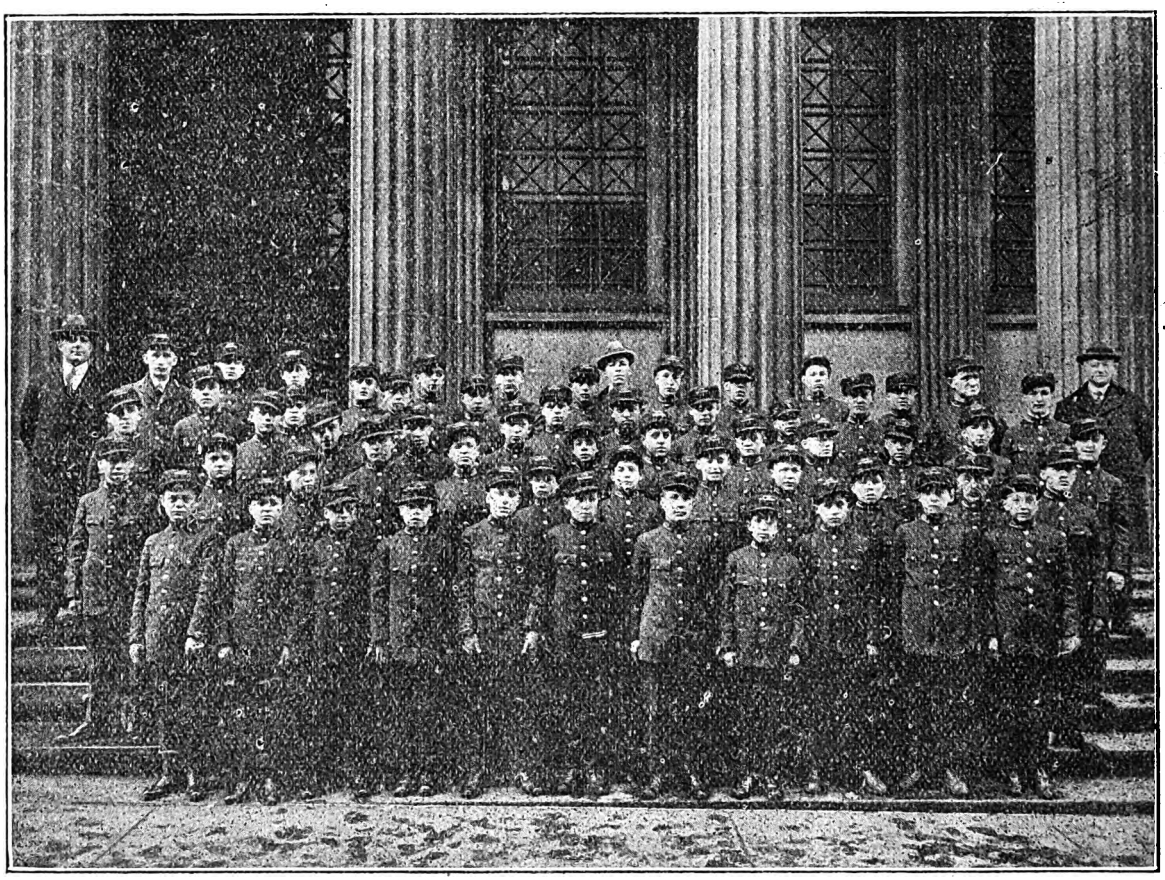
The Canadian Pacific Railway Company's Telegraph Messenger Boys, Montreal, Que.

We are in receipt of the accompanying photograph showing the messenger staff of the Canadian Pacific Railway Company's Telegraph messenger boys, Montreal, clothed in new uniforms supplied by the company. The photograph was taken about a month ago which accounts for the winter caps. At the right-hand side of the picture is Superintendent J. Mitchell, at the centre is G. W. Bancroft, telegraph agent, and at the extreme left-hand is G. A. Garden, in charge of the delivery.



Message Girdles the Earth in Eighty Seconds

The official message of King George to the overseas dominions in which he pronounced the British empire exhibition open, girdled the earth in eighty seconds.

It was sent direct by telegraph from the exhibition to a cable office, thence by imperial cable to Halifax, then over the Canadian Pacific Telegraph Company's land lines to Bamfield Creek, B. C. From there it was cabled to Sydney, Australia, relayed across that continent by land wires, and sent by cable to Durban, which relayed it to Capetown, which in turn sent it back to Wembley, via the Azores.

The beginning of the message began to come in at Wembley just as the sending operator finished his work.

Canadian National Telegraphs

Ralph Carmichael, chief operator at Edmonton, who died on February 26th, was born at Spencerville, Ont., on June 26th, 1877. He attended public school at Spencerville and high school at Kemptville. He learned telegraphy from his father, who conducted a general store at Spencerville, his father being the postmaster and also the Government telegraph operator. After assisting his father for some time, he took a position as operator at Bruce Mines, Ont.

In 1907 he went to Strathcona, (which is now South Edmonton,) and entered the service of the Canadian Pacific as operator at Lethbridge, Alta., in 1908. He was transferred to Edmonton in 1911, entering the service of the Canadian National Telegraphs in February, 1914 as branch manager at South Edmonton. In August, 1914, he was transferred to the Main Office in Edmonton, as operator, being promoted to the position of chief operator in October, 1920, which position he held until his death after an illness of only four days. He was a capable, efficient, popular employee, and his death is universally regretted. He is survived by a wife and one child.

H. F. Russell, manager of the Commercial Cable Company in England, with headquarters at London, arrived in New York on April 11th.

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Retires on Pension

Another Plymouth Boy Who has Made Good Now Goes into Retirement

By "Old Farmer Lawton"

John R. Michaels is spending a few days with his sisters, Miss Mary Michaels and Mrs. M. C. Shaffer, and also rounding up the few of his boyhood friends that are still living in Plymouth, Illinois. In other words, Mr. Michaels is really loafing for the first time in his life.

This may not sound odd to those who have not followed his busy life, and the word "loafing" is too coarse and vulgar to express the true meaning in his case. In other words after being on a large railroad's pay-roll in very busy capacities for most three-score years Johnnie, as we are wont to call him here in Plymouth, concluded to retire to private life on April first and was pensioned out for life by the Minneapolis, St. Paul & Sault Sainte Marie, better known as the "Soo" Lines which he had served most faithfully as superintendent for the past twenty-one years. That he was highly esteemed and greatly loved by the employees under him was demonstrated on his retirement when about three hundred of the old employees from section men up to operators, agents and train crews presented him with some very exquisite jewelry set with diamonds, while the heads of the different departments expressed in the kindest words their love and loyalty to their departing Boss.

In addition to a substantial pension for life Mr. Michaels is furnished with free transportation to go and come at will. Still, we occasionally hear it said that big railroads and other large private concerns have no heart. Happily, this false understanding has practically vanished since our government made such an expensive failure in trying to handle them through political pulls, and not on men's real merit, as was done during the late World's war.

After a short visit in Plymouth, Michaels is going to look up an olive orchard he owns in California, and which he has never taken the time off to go and see before. After a brief stay on the Pacific coast he expects to spend most of the coming summer at his birthplace on the Atlantic coast in Maine.

Michaels has practically held but three positions during his life. In 1864 when about ten years of age, his father, R. C. Michaels, then agent for the C. B. & Q. at Plymouth, brought John here and put him into school with us other boys, after buying him a pair of the first "store" skates we had ever seen, and telling him to have a good time and learn all he could. His dad must have put a heavy accent on the word "Learn" as Johnnie did not take much to sports and soon became an expert operator, having learned the art by sound. Nine-tenths of the operators, including his own father, in those days could only read the dot and dash language as it was printed after running through the register machines then in use.

In a few months, little Johnnie as we knew him then, was called up and down the Quincy division to temporarily relieve old agents and operators. His work was so satisfactory both to the company and the public that Superintendent F. H. Tubbs with headquarters at Galesburg saw the making of a great railroad man in young Michaels, and induced his father, mingled with the tears of his own good mother, to let him take Johnnie to Galesburg as his private operator and chief clerk. He remained with the Burlington until the early eighties when he received a call from the St. Paul and Duluth Company, where he continued to climb up from a train dispatcher, to chief dispatcher and then to road master. Leaving that company after fourteen years of continuous service, he accepted a higher position with the "Soo" which he held for twenty-one years, until his late retirement. That Mr. Michaels was always popular with his associates and those under him was also shown when he quit the St. Paul & Duluth as the old employees of that company presented him with a beautiful gold watch which he carries to this day.

Superintendent Tubbs, with whom I was associated for many years later on, always spoke most affectionately of him as his boy Johnnie. Mr. Tubbs lived to the good old ripe age of eighty-five years, and I am sure if he were alive today he would join me and other old-time friends in wishing John R. Michaels most sincere and loving wishes for years of peaceful happiness and enjoyment.

E. H. Heintz, of Fruitvale, Calif., in remitting to cover his subscription for the year 1924, says:

"It always gives me pleasure to remit for the new subscription, because, not alone of the interesting items, but it affords me a medium to now and then keep in touch with many friends and brings back memories of good old days with those whom I have been associated."

According to Webtser

A puncture is a little hole found in motor-car tires at long distances from telephones or garages.

She was a telephone operator and ought to have known better than to put the subscriber on the wrong number. He thought he was connected with the local theatre, and being in a hurry, he promptly asked for a box for two for that night.

"But we don't have boxes for two," said a voice at the other end of the wire.

"Isn't this the Lasca Theatre?" he asked.

"No," was the answer, "this is Graves, the undertaker."

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EDITORIAL COMMENT

Marconi Appeal Dismissed

THEIR lordships dismissed the appeal of Marconi Wireless Telegraph Company, Limited, London, in their action for infringement of patent rights against Mullard Radio Valve Company, Limited.

The alleged infringement consisted in the manufacture and use of a type of valve known as the Mullard valve. In this construction the filament consists of a substantially straight piece of tungsten wire which is surrounded by a cylindrical grid, which in its turn is surrounded by a cylindrical anode, the ends of the cylindrical grid being substantially level with the ends of the filament, but protruding slightly beyond the ends of the anode.

It was contended by the Marconi Company, who hold Rounds patent, that the Mullard valve exhibited the advantage which it was the object of the Round invention to achieve, namely, that in operation it was unnecessary constantly to vary the potential of the grid. It was, however, contended by the respondents, and was found in courts below, that the Mullard valve did not constitute an infringement of Round's patent upon the ground that the grid and filament in the Mullard valve were open ended, and that according to the true construction of Round's patent it was necessary that the grid, and possibly the anode must also have one or both ends physically closed. Justice P. O. Lawrence and the Court of Appeal having decided against the Marconi Company, the case was taken to the House of Lords.

Lord Dunedin, who submitted the leading judgment, said that when he found that the subject of a patent worked well, and obtained results which had not been obtained before, he did his best to uphold that patent. Unless fair protection was given to the patentees research was crushed in the bud, and with it all that eventual benefit to the public which research brought. He found it impossible, though against his will, to come to any conclusion other than that the appeal failed. Round's own explanation seemed to be conclusive, for he said he could not claim as a new arrangement a vacuum tube containing a hot filament, a grid, and a third electrode. That had already been invented, and he did not propose to add anything new. When one came to the claim it seemed impossible to read the word "closed" except in its ordinary and natural meaning, physically and geometrically closed.

Viscount Cave and Lord Buckmaster concurred, and the appeal was dismissed with costs.

Breaks World's Speed Record

The world's speed record for copying of radio telegraph code signals was shattered when A. E. Gerhard received straight copy at the astounding speed of 59½ words per minute, at a contest held at the Fourth Annual Convention of the Second District Executive Radio Council at the Pennsylvania Hotel, New York, on March 7th.

Mr. Gerhard is an operator in the employ of the Radio Corporation of America, and his remarkable feat of raising the former world's record of 56 words per minute has given him the plaudits of the entire radio world.

What a remarkable aaccomplishment this is can best be appreciated, perhaps, when one figures that his record is three times as fast as the usual speed used in ship radio communication.

Commenting on the foregoing. The transmission of the words at 59½ words per minute must have been automatic and not hand transmission—as the fastest hand transmission never exceeded 52 words per minute in National Tournaments where copy was transmitted by hand using the Morse code. The item does not state whether Mr. Gerhard used the Morse or Continental code or whether the copy was the same as used in former tournaments. It is a well known fact that the American Morse operator is the fastest telegrapher in the world. The American operator by use of the Phillips' code can handle 3,600 words an hour if necessary in the ordinary day's work and has done it right in the Denver Post office.

Alaska Weather

With elaborate preparations already made, additional plans to facilitate the passage of an American army squadron around the world were going forward at Dutch Harbor (Unalaska), on April 17th.

Snow was falling but reports received from Chignik, 900 miles eastward, and the last stop of the expedition on the American continent, had indicated that three of the four planes engaged in the adventure would fly to Unalaska soon.

The word from Chignik was that Lieut. Lowell H. Smith, Lieut. Erik Nelson and Lieut. Leigh Wade, the flyers who reached that point while their commander, Maj. Frederick L. Martin, was stopped at Kanatak, 120 miles further back on the route by a leak in his crank case, were "getting hard boiled on Alaska weather."

Twice these three aviators had made a day's stage with an Alaska tempest rocking their machines and pounding hard Alaska snow into their eyes.

This is the last land station for electrical communication on the route of the flyers until they shall have reached Japan.

Communication between Alaska and the Kurile Islands, Japan, 1,758 miles further on, was to have been maintained by the cutters Halda and Algonquin of the United States coast guard, which arrived in Dutch Harbor on April 16th.

But Lieut. Clayton Bissell, advance officer for the flight, announced he would place an emergency on Atka island, 350 miles beyond Alaska, and the next scheduled stop, at once.

THE Poland Government has decided to transform the Polish telegraph agency, the news disseminating organization, into a state enterprise.

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Whether used on closed or open circuits, the Edison Primary Battery is superior to the dry cell in long life and endurance.

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

A copy of the Printed Proceedings of the Telegraph and Telephone Section of the American Railway Association covering the annual meeting held at the Antlers, Colorado Springs, Colo., on September 18th, 19th and 20th, 1923, has just been received. It is bound in a substantial cloth cover and the book consists of 806 pages, measuring six inches wide by nine and a quarter inches in length. The book is brimful of valuable information for all telegraph and telephone heads of railroad companies and those who do not receive a copy of this work are missing a rare treat in up-to-date management covering these two important departments of the railroad profession. W. A. Fairbanks, 30 Vesey Street, New York, is the secretary of the association and the books are being mailed from the bindery and printers, which is located in Chicago.

The specifications for telegraph and telephone and other communication wires and cables crossing railroad tracks and electrified railroads are now available in pamphlet form. Copies may be obtained from the secretary, W. A. Fairbanks, 30 Vesey Street, New York City, at fifty cents per copy.

The secretary expects to issue in the near future additions to the Manual Pocket Handbook. This will include all items which have been adopted to January 1st, 1923.

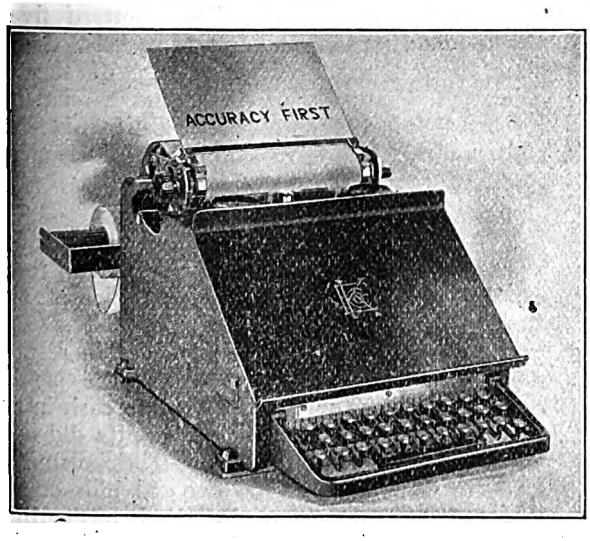
A meeting of Committee No. 4—Electricial Protection was held in New York on April 22nd and 23rd, at which were present J. F. Caskey, Bethlehem, Pa.; P. Norton and H. W. Drake, New York; L. Behner, Pittsburgh, Pa.; G. H. Mayer, Stevens Point, Wis.; P. A. Rainey, Philadelphia; W. L. Cook, Chicago; W. M. Gould and A. H. Schirmer, New York.

A meeting of Committee No. 11—Telegraph and Telephone Transmission, was held in New York on April 24th and 25th. Those present were: B. F. Thompson, Baltimore, Md.; C. E. Baxter, Detroit, Mich.; C. D. Briggs, New Haven, Conn.; J. H. Ditch, Philadelphia; S. L. Elliot, Montreal; E. B. Adams, W. H. Capen, F. F. Foland, H. W. Drake and C. F. Stearns, New York.

A meeting of Committee No. 7—Inductive Interference was held in New York on April 15th, 16th and 17th. Those present were L. Behner, Pittsburgh, chairman; A. H. Armstrong, Schenectady, N. Y.; R. D. Evans, Pittsburgh; M. R. Greenamyer, Philadelphia, W. A. Jackson, Detroit, Mich.; H. W. Trueblood, and R. L. Whitehouse, New York.

A meeting of the special committee on rules for committee work was held in New York on April 18th at which were present H. C. James, Jr., chairmain, St. Paul, Minn.; M. R. Greenamyer, Philadelphia, and L. F. Shea, New Haven, Conn.

A meeting of Sub-Committee A 1—Creosoted Poles and Pole Line Material was held in New



"SAY IT TO THE OTHER END IN WRITING."

Four Telegraph Typewriters enable one Railroad to move freight cars twenty-four hours earlier than before the installation was made.

These typewriters are in series on a way wire connecting freight yards, piers and general offices. Motor generators are eliminated by equipping the alternating current points with A. C. motors. All relays are eliminated and although the typewriters are connected electrically like main line sounders, no adjusting is necessary during wet weather conditions.

The machines are used continuously. During the day the messages and waybills are taken from the machines as they are received. At night the receiving clerks go home but the machines stay "on the job to take the message." All night long they receive without human aid.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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York on April 17th and those present were: H. C. James, Jr., St. Paul, Minn., chairman; E. Kenward, Toronto, and H. A. Shepard, New Haven, Conn.

A MEETING of Committee No. 10—Education and Training of Telegraph and Telephone Employees will be held at 431 So. Dearborn Street, Chicago, Ill., on May 12 and 13. The first day's session will convene at 10:00 A. M. (Chicago Daylight Time.)

A meeting of Committee No. 6—Message Traffic will be held at 431 So. Dearborn Street, Chicago, Ill., on May 14, at 10:00 A. M. (Chicago Daylight Time.)

A MEETING of Sub-Committee "A"—Construction and Maintenance of Pole Lines, Wires and Cables, will be held at the Mount Royal Hotel, Montreal, Quebec, on May 21 and 22.

A meeting of the Committee on Nominations will be held at 431 South Dearborn Street, Chicago, Ill., on May 13th.

THE annual meeting of the Telegraph and Telephone Section of the American Railway Association, will take place at the Hotel Frontenac, Quebec, Que., September 9th, 10th and 11th. It is expected that a large attendance will be present on account of the many attractions in and around Quebec.

All America Cables

MANAGER J. F. WHALEY of Santa Elena, Ecuador, has left that station on furlough. Station Electrician R. F. Johnston will be acting manager until the arrival of Manager J. O. Wiseman.

R. L. McCann of the Construction and Maintenance Department, has returned to New York after a trip to the West Indies.

D. P. Cacoulaids arrived at Tampico, Mexico, where he will be acting manager.

Clerk in Charge J. Clark of Buenos Aires, Arg., has left on furlough.

Traffic Engineer A. Cunningham has left New York for Balboa, C. Z.

A. J. Brady of Tampico has sailed for Salina Cruz, Mexico, where he will be manager.

C. B. Lawrence, superintendent of the South American land lines, has arrived at La Paz, Bolivia, on an inspection trip.

Radio Corporation of America

GENERAL JAMES G. HARBORD, President, spoke at the Columbia High School, South Orange, N. J., on April 14th, to a large attendance of residents. General Harbord told of his experiences as a member of the American Military Mission to Armenia several years ago.

General Harbord was also a guest and speaker at the War College at Washington, D. C. on April 25th.

GENERAL JAMES G. HARBORD, has sent a statement to the Finance Committee of the United States Senate, protesting against the proposed ten per cent tax on radio sets.

David Sarnoff, Vice-president and General Manager and Pierre Boucheron, Manager of the Advertising and Publicity Department attended a meeting of the Chicago Association of Commerce at Chicago, on April 23rd.

Death of George L. Wiley

GEORGE LOURIE WILEY, aged seventy-five years, New York representative of the Standard Underground Cable Company, Pittsburgh, Pa., for the past thirty-six years, died at his home in Orange, N. J., on April 16th. Mr. Wiley was well known to the electrical fraternity and his death proved a great shock to his old acquaintances and friends. In his early business career he worked for the Gold and Stock Telegraph Company and the American District Telegraph Company and was intimately acquainted with all the old time telegraphers. In the early eighties he left the telegraph art to take his chances with the electrical industry and he never regretted making the change. When the Standard Underground Cable Company of Pittsburgh was organized, Mr. Wiley became its New York representative and he held that position until the time of his death. Mr. Wiley is survived by his wife, three sons and three daughters. Mr. Wiley was buried from Grace Church, East Orange, on April 19th and interment was at Greenwood Cemetery, Brooklyn, N. Y. The funeral services were attended by all of the executive officers of the company from Pittsburgh, Pa.

Federal Telegraph Company

R. P. SCHWERIN has resigned as president of the Federal Telegraph Company of California and will devote all his time to affairs of the Federal Telegraph Company of Delaware. He will leave for China soon to superintend erection of five great wireless stations. Rudolph Spreckels, San Francisco banker, has assumed charge of the Federal Telegraph Company of California as chairman of its board of directors. The California company controls the Delaware company jointly with the Radio Corporation of America.

Armed Men Hold Up Office and Get $2

Two armed men held up the manager of the Western Union Telegraph Company's office at No. 749 Broad Street, Newark, on April 7th. They accepted two $1 bills offered by the manager in response to their demand that he "hand over all the 'jack' in the cash drawer." There was $1,000 in cash in another part of the drawer, which the bandits did not get.

The office manager, Michael Scholamero said when he handed them the two $1 bills one of the bandits asked: "Is that all there is in the drawer?"

"That's all," said Scholamero. The bandits walked out of the office and escaped.

If you see anything pertaining to the telegraph, the cable, the telephone or radio in the columns of Telegraph and Telephone Age it is true and can be banked on as true.

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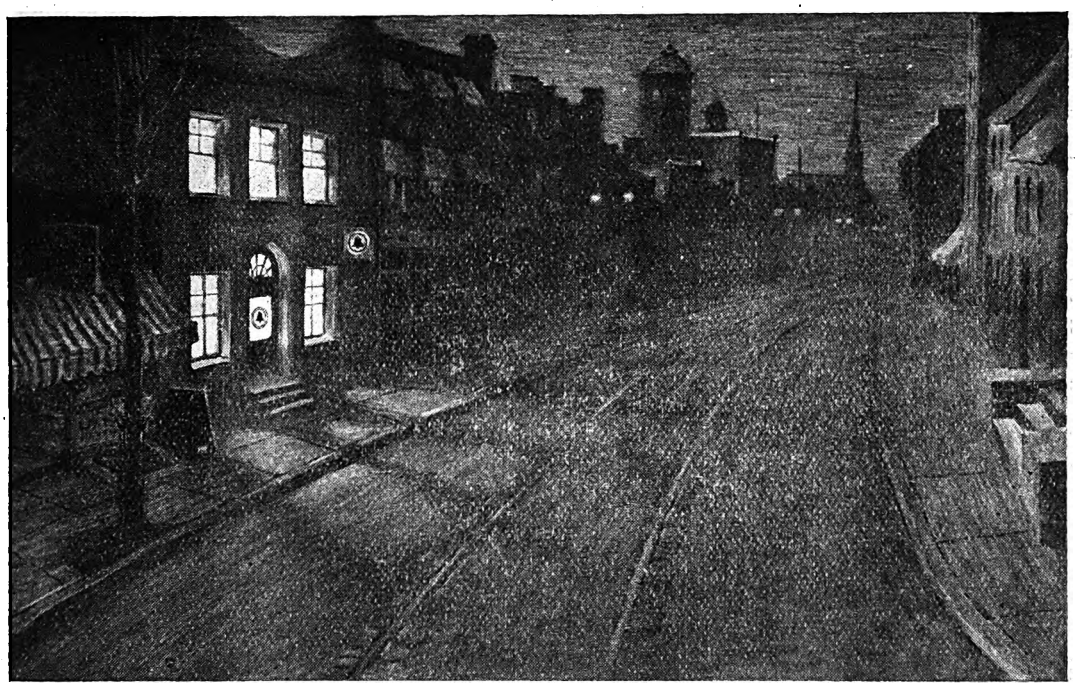

In the Dead of Night

In the dead of night a fire breaks out—the alarm must be given. A child is taken sick—the doctor must be called. A thief enters the home—the police must be located.

In the dead of night the American turns to his telephone, confident he will find it ready for the emergency. He knows that telephone exchanges are open always, the operators at their switchboards, the wires ready to vibrate with his words. He has only to lift the receiver from its hook to hear that calm, prompt "Number, please." The constant availability of his telephone gives him security, and makes his life more effective in wider horizons.

Twenty-four-hour service, which is the standard set by the Bell System, is the exception in the service of Continental Europe. An emergency may occur at any time. Continuous and reliable service has become a part of the social and economic fibre of American life.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

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PERSONAL

RONALD S. WISHART, the New York representative of the Morkrum Company, Chicago, Ill., with offices in the World Building, New York, was married on April 5th to Miss Elizabeth Lathrop, daughter of Henry Falke.

POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice-president and general manager, intends to make an address at Atlantic City during the coming month on the history and development of the telegraph and cable.

C. A. Comstock, vice-president, is inspecting offices in the Western Division.

J. F. Skirrow, vice-president and chief engineer, has returned from an inspection trip in Florida. He also spent several days in Atlanta, Ga. on plant matters.

Rufus Gould, general supervisor of plant, has returned to Texas to supervise the construction of the new trans-continental line.

R. B. Naugle, of the plant department, is in Gulfport, Miss., in connection with testing line material.

The offices of F. P. Phillips, superintendent of plant, Eastern Division, A. C. Johnson, assistant engineer and J. H. Mayer, district plant supervisor, have been transferred to 20 Broad Street, New York City.

Superintendent E. Kimmey has returned from inspecting offices in the State of Connecticut.

The building in which the office at Derby, Conn. is located is now being torn down and after remodelling has been completed, it is the intention to move back, at which time the office will be equipped with the latest Postal standard fittings.

R. I. Roberts, operator, Passaic, N. J., is confined to his home on account of illness.

A branch office was recently opened in the Hotel Taft, New Haven, Conn., with Miss Pulma Wilson in charge. Miss Wilson formerly was the manager at Framingham, Mass.

JOHN F. COOGAN, manager of this company's office at Newark, N. J., and who has been in the telegraph service for fifty-two years, has been retired on pension. James Hoffman succeeds to the management at Newark, vice Mr. Coogan.

New York City

BOB TELSCHOW, southern quad chief, has returned after an absence of over a month, due to illness.

Mrs. E. Salomini, formerly Emma Hassel, operator in City One, called recently to see her friends, and to show them her young daughter.

Bob Walsh, is now in charge of City Three, vice J. B. Havice, who has been transferred to the loops.

George Mitchell, wire chief, was confined to his home for a week with a slight attack of La Grippe.

Bob Stewart, and Jim Williams, two of the old timers celebrated their birthday on April 10th. Bob acknowledges sixty years, while Jim is two years his junior. They both look good for many years yet.

Spring Dinner of Magnetic Club to Be Gala Affair

THE Spring dinner of the Magnetic Club will be held at the Hotel Commodore, 42d Street and 4th Avenue, New York City, on Saturday, May 10th, at 6:30 P. M., and unless all signs fail, and notwithstanding the successes which the Magnetic Club has enjoyed in the past, this dinner will establish a new record, far in excess of anything previously accomplished in the long history of this famous club.

In the first place, it will be made the occasion for celebrating the 40th anniversary of The Mackay System, which was established in 1884, and the date, May 10th, will be just two weeks short of the 80th birthday of the electric telegraph, the practicability of which was first demonstrated by Professor Samuel F. B. Morse on May 24, 1844.

With two such distinguished anniversaries to celebrate, the Magnetic Club will strive its hardest to outdo itself.

Clarence H. Mackay, President of the Postal Telegraph-Cable Company, will honor the occasion by his presence, and it is violating no confidence to say that he is manifesting a very keen personal interest in the arrangements which are being made for the dinner.

The Trustees and Directors also will be present, and a number of distinguished guests have been invited and signified their intention of attending.

In addition to a musical program to be given by some of the most eminent artists of the Metropolitan Opera Company, there will be given the first showing of the long-awaited motion picture film which depicts the varied activities and operations of the cable and land-line systems, extending more than two-thirds around the earth. This picture is absolutely unique, as it shows scenes which have never previously been photographed for the movies, and not the least attractive feature of it is that the pictures were made as actual work was being done. This is not a film which was staged merely for the movies, but is absolutely the real thing.

It is confidently expected that there will be at least twice as many diners at this dinner as ever before attended one of these affairs, so it is important that the committee know as soon as possible just how many to provide for, in order that proper arangements may be made for the comfort of members and guests. Therefore it will be the part of wisdom to notify Joseph J. Cardona, Treasurer, 253 Broadway, whether you are coming or not as soon as possible.

On this occasion all employees of the Mackay System, as well as all members of the Magnetic Club, may obtain tickets for the dinner at $2 each. Guest tickets, as usual, will be $5 each.

Commercial Cable Company

MESSRS. E. Ronot, D. H. Walsh and A. W. Sunderland, Commercial Cable European representatives, who were in the United States for the past month, sailed from New York on the Steamship "Berengaria" on April 23rd.

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THE WESTERN UNION TELEGRAPH CO.

A CONFERENCE of general managers, division traffic and plant superintendents was held in New York last week. Those present were: General managers, M. T. Cook, San Francisco; T. W. Carroll, New York; H. C. Worthen, Atlanta, Ga.; A. C. Cronkhite, Chicago; A. D. Bradley, Omaha, Nebr.; F. A. Mohr, Dallas, Texas; A. B. Cowan, Denver; Division traffice superintendents, J. P. Edwards and Colonel I. D. Hough, New York; H. G. Heininger, Atlanta, Ga.; C R. Fisher, Chicago; A. Long, Omaha, Nebr.; B. P. Hancock, Dallas; R. B. Cowardin, Denver and W. L. Glasheen, San Francisco; Division plant superintendents, M. C. Allen, New York; L. H. Beck, Atlanta, Ga.; M. B. Wyrick, Chicago; W. W. Watt, Omaha, Nebr; J. G. Hilbert, Dallas; H. E. Biggle, Denver, and J. L. Ord, San Francisco. There was also present at the conference besides President Newcomb Carlton, Vice-presidents J. C. Willever, in charge of commercial; J. J. Welch, in charge of traffic and G. M. Yorke, in charge of engineering, E. R. Shute, operating engineer, traffic department and many others. This is the usual annual conference of the officials of the company.

The division traffic superintendents, while in New York, attended the Follies on April 24th at the Yorkville Casino, staged by the operators at 24 Walker Street.

Chief Operators Appointed

O. C. SCOTT at Fort Smith, Ark.; J. A. McLaughlin, Atlantic City, N. J.; C. W. Saleski, Bridgeport, Conn.; G. Buchanan, Troy, N. Y.; C. J. Zimmerman, Marion, Ohio and F. D. Eddy, acting chief operator at St. Petersburg, Fla.

Memphis, Tenn.

A LARGE branch office tube system is now being installed by the Company in Memphis, Tenn. Over 30,000 feet of copper tubing will be installed in the streets. Ten branch offices will be connected initially in addition to two house tubes which are at present in operation. Air for operating the system will be supplied by two large motor driven compressor units, one for regular and the other for reserve operation. In order to regulate the quantity of air delivered by the compressors, 35 H.P. variable speed driving motors are being installed. These motors are special because of the three phase alternating current supply and the special service which makes economical operation of the motors desirable at all speeds. The regular variable speed induction motors with variable resistances in the armature were found impracticable because of the poor efficiencies at low speeds. It has therefore been decided to provide motors with characteristics including efficiencies very similar to those of variable speed direct current motors with field control. These alternating current motors, as far as we know, will be the first of this type to be installed in this country at least in such a small size. For this reason it will be interesting to watch this installation as it probably will be only a forerunner of a number of alternating current installations which may have to be made because of the leaning of power companies toward alternating current distribution.

Denver, Colo.

THE Company's emergency power plant at Denver, Colorado, consisting of a gas engine and associated equipment has been replaced by modern equipment. The new unit consists of a 60 H.P., 4 cylinder, 720 R.P.M., Buffalo gasoline engine direct connected to a 32 KW, 220 volt Ideal alternator.

The engine and alternator are assembled on a cast iron sub-base mounted on springs to prevent vibrations being transmitted to the building.

The engine is equipped with a water regulator which automatically maintains a constant engine temperature by controlling the flow of cooling water. This is accomplished through the action of a thermal element inserted in the cooling water exhaust pipe which operates the intake valve. A Boyce Motometer is mounted on the engine control panel and indicates the temperature of the jackets at all times.

Syphon fuel pumps are used on the engine. These pumps require no packing, depending on the action of a metal bellows to secure the pumping effect.

Two independent ignition systems are provided consisting of separate spark plugs and separate American Bosch, single spark magnetos equipped with impulse starting couplings.

Mrs. Ida C. Sackett

Mrs. Ida C. Sackett of 171 Dunmoreland street, for many years chief operator and wire chief with the Western Union Telegraph Company in Springfield, Mass., has resigned to accept a more important position. Mrs. Sackett enjoys the distinction of being one of the only two women operators in the employ of the company having handled both these branches of traffic with unusual efficiency and judgment. She has "graduated' many Morse operators whose success in various fields has been largely due to her unlimited patience and friendly counsel.

Her career has been a source of great satisfaction and pride to those associated with her, and her leaving is much regretted by both officials and employees, who banded together to show their love and appreciation by a banquet in her honor at the Hotel Highland a few evenings ago, when she was presented with a beautiful wrist watch, the speech of presentation being made by Charles W. Samuels of New York.

The banquet hall of the Highland was gaily decorated and the guests provided with paper caps, balloons, etc. After the banquet the guests were entertained by George Dowd of the Philharmonic quartet in a repertoire of songs, accompanied by Pike's orchestra, which also furnished music for the dancing. There was also much local talent present and many impromptu numbers, speeches, etc., making the occasion a merry one. Mrs. Sackett's many friends in the employ of the Western Union

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Telegraph Company wish her the best of success in her new duties.

Among those present were: J. P. Edwards of New York, division traffic superintendent; W. C. Rogers of New York, division supervisor of traffic; Joseph P. Hayes of San Francisco, president of the Association of Western Union employees; Charles W. Samuels of New York, division supervisor of traffic; Park F. Harrington of Boston, division vice-president of the Association of Western Union Employees; Harry R. Finley of Boston, division supervisor of equipment, and S. B. Thomas of New York, division traffic inspector.

Retiring Telegrapher Given Loving Cup

ARTHUR MITCHELL, former night chief operator at St. Louis, and landscape artist, who retired on March 31st, after forty-two years work with the Western Union Telegraph Company was given a testimonial luncheon by the night employees of that company at the American Hotel on April 3rd. L A. Bauer made a presentation of a silver loving cup to the veteran operator on behalf of his fellow workers.

Those who made talks on not only Mr. Mitchell's ability as an artist, but the praiseworthy traits of his character, as shown every day among them, were: P. D. Herron, chief operator: G. C. Benne, who will succeed Mr. Mitchell as night chief operator: W. P. Jost, assistant chief operator; Joe Dunlap, Morse supervisor, and W. W. Warner plant chief. R. J. Ludwig, assistant chief operator, was toastmaster.

Mr. Mitchell did not take up art until he was thirty-six years old, yet he made great progress and his sketches have won prizes.

Old Time War Reminiscence

JOSEPH MARSHALL, chief operator of the Western Union Telegraph Company at Savannah, Ga., writes as follows: "I was your agent in Richmond, Va., in 1883, and remember as subscribers to the Telegraph Advocate, W. T. Mobley, Charles Slaughter, W. H. Hayden, John S. Ernest, Barrington L. Brannan and others. I read with much interest, in a recent issue, Mr. Buchert's reference to George McGovern of Richmond, Va., who managed to get inside information in Washington and furnish to out of town papers. When I entered the Western Union Telegraph service in Richmond in 1877 George McGovern was an operator there, and I recollect him telling that in 1862 he was manager for the Western Union Telegraph Company at Goldsboro, N. C., but becoming tired of the job, resigned. Superintendent Dowell had trouble finding a man to relieve Mr. McGovern, and the latter became impatient at the delay and told Superintendent Dowell he was not going to wait any longer and would leave the keys to the office at the hotel. Superintendent Dowell replied that if he left before he was properly relieved he would put him in the army. George McGovern did not wait for relief but went to Fredericksburg and saw the Federal army charge Mary's Heights, and from there went to Washington, crossing the Potomac during the night. Mr. McGovern spent a fortune buying up patents that appeared to be of value but had no luck with any of them. Joseph McGovern, his brother, was an operator with General Robert E. Lee and was at Appomattox at the surrender.

When I entered the service practically all of the operators and management had been in the Confederate service. J. W. Kates was superintendent; R. M. J. Paynter, manager; Joseph McGovern, chief operator; N. C. Pamplin, James Burruss, Fred D. Cudlipp, operators.

Mr. McGovern said that Superintendent Dowell sent an operator to Dutch Gap, about ten miles down the James River from Richmond, to report on an expected fight between the Federal gunboats and the shore batteries. The operator was instructed to make a dot for each cannon shot. For a few minutes the dots were scattering, but presently he was making dots so fast that the superintendent cautioned him that he did not mean any nonsense. The operator replied that he was giving actual conditions, in fact, he could not keep up with the cannonading. I think the operator was Nat Topping for many years operator at 195 Broadway, New York and who died at Plainfield, N. J. on August 30, 1922.

Rum-Runners Suspected of Cutting American Cable. Captain Sparks to the Rescue

THAT the crew of the alleged rum-running schooner Prince Albert cut the Pacific cable twenty-five miles from San Francisco, entailing a loss of $100,000 to the Postal Telegraph Cable Company, is the belief of the Company officials, who, on November 27th offered a reward of $1,000 for evidence leading to the apprehension of the guilty persons. As soon as the cable repair ship Restorer appeared on the scene to splice the broken cable, the Prince Albert raised anchor and left hastily for the north. It is now presumed to be in Vancouver.

"Besides having the cable out of commission for several days, entailing a large loss of revenue, the Restorer was obliged to speed at forced draft all the way from Honolulu to San Francisco to pick up the broken cable," said Captain V. F. Sparks of the repair ship. "Sailing at top speed is expensive. The break in the cable was about fifteen miles west of Montana. When the Restorer reached the spot the Prince Albert was anchored close by. After it saw night lights, which showed we were repairing the cable the Prince Albert left the vicinity suddenly.

The cable had been cut in two with an axe. It is probable that the vessel's anchor caught on the cable, and when raised to the surface made a heavy weight. Rather than take the trouble to disentangle the anchor from the cable the rum runners presumably chopped the latter in two with an axe.

The break was in 300 feet of water, where no vessel but a rum runner would anchor. The law on wanton destruction such as this outside of territorial waters is not clear, but we will endeavor to have some precedent established. The same 'accident' might occur again and again if rum runners are going to continue anchoring in this vicinity."—San Francisco Chronicle.

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Broadcasting and the Entertainment Industry.

By "BRITANNICUS," London, Eng.

Notwithstanding the repeated assertions of the Broadcasting Company, which are of course prejudiced, the fact that broadcasting is having a very serious adverse effect on attendances at places of entertainment can no longer be disputed, corroboration having recently arrived from places as far apart as Croydon and New York.

A concert promoter in the first mentioned town declared recently, that this season has been the worst he has ever known, and he has no hesitation in attributing his "bad time" to broadcasting, as numerous old patrons whom he had met stated that it was unnecessary to leave their homes nowadays, as they obtained the same entertainment from practically the same artists on the wireless and "for nothing"! Other members of his audience had openly told him that the songs and jokes given by the artists engaged had already been heard from 2LO and were stale!

This means that artists who accept engagements at 2LO cannot expect to draw concert fees elsewhere. It must be either one or the other, it cannot be both, obviously.

Even the high-class Ballad and Orchestral concerts have felt a slump and the National Sunday League have found it necessary to inform artists engaged by them that they must refrain from "Broadcasting" or future engagements cannot be considered.

An official of the League recently declared "that there can be no question as to 'Broadcasting' making itself painfully felt to the discomfort of the overcrowded concert profession." Not only have attendances been seriously influenced but in some cases concerts had to be abandoned altogether owing to lack of patronage.

From "Lil ol New York" comes the news that the Society of Dramatic Authors and Composers in that city are up in arms with the various broadcasting concerns there. Hitherto, the latter have been able to persuade the former that the tremendous advertisement given their work by broadcasting it to "the world," more than balanced any claim for royalties but from the resolution recently passed by the society mentioned, to the effect that: "Dramatic, literary and artistic works may not be reproduced in any way without the consent of the author, either with or without payment of royalty," has caused a sensation.

Dramatists and composers claim that they are entitled to royalties from the radio people on the same lines which they collect fees from the Cinema or Gramophone people.

The broadcasting companies scout the idea as impracticable and state that they broadcast to a non-paying audience, the thousands of listeners-in being "deadheads" so far as fees are concerned, and a subscription fund has been started by the "four hundred" in New York to provide funds for the payment of fees to authors and artists.

This attitude on the part of the American Society plainly shows that damage is being done by the wireless in the United States and to an unbiased mind there can be no question that something similar is happening in this country; the only alteration in England being that the broadcasting people draw huge license fees and pay no entertainment tax.

The British Broadcasting Company management make much of expenses attached to their transmitting stations, but are they aware that it costs nearly two thousand pounds a week to run a west-end theatre these days or nearly double what it did pre-war? The idea of forming their own companies at 2LO does not seem to amount to much from the present quality of the programmes, on which only few names have any pretension of being first class. The British Broadcasting Company claim that the broadcasting of items from plays increasing attendances is ridiculous and as a leading manager put it recently:—

"If an item is broadcasted WELL why should the listener-in spend money in attending the theatre?

"On the other hand, if the item is received badly, possibly owing to the listener-in's inability to adjust his (or her) apparatus, any possible inclination to see the performance is promptly knocked on the head".

Surely if the newspapers consider it imperative that news items should not be broadcasted before 7 P. M., the theatre is entitled to the same protection. And further, if the entertainment tax is liable on the annual subscriptions of the members of a County Cricket Club, surely the British Broadcasting Company who entertain many thousands, should contribute to the country's coffers.

EMF Electrical Year Book

THE Electrical Trade Publishing Company of Chicago, has issued the third annual edition of the "EMF Electrical Year Book," which has been entirely revised and much enlarged. It now has over 1550 pages of which 1080 form the main text. This includes facts and figures about each branch of the electrical industry, its leading activities and all its products. There are some 3200 classifications of these, each with a list of its manufacturers. Over 7800 trade names are separately listed. There are also over 5900 definitions of electrical terms and much other frequently desired information, the whole making a very useful reference book. It is all arranged alphabetically to facilitate reference. The price of the book is $5. For sale by Telegraph and Telephone Age, 253 Broadway, New York.

New Cables

THE T. Dellwood, of the United State Signal Service, after taking on board cable at Woolwich, London, England, intended to be laid between Seattle and Alaska (the existing cables have been in use for a long period and require replacement), left London for America on March 27th.

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First Radio Circus Broadcasted

FROM calliope to chariot races, from spectacular opening to the ballyhoo of side show "talkers," the circus has gone over the radio.

Westinghouse Station KYW, recently broadcasted for the first time in radio history the Metropolitan opening of big show—the fifth annual premiere of Sells-Floto circus in Chicago's Coliseum.

With a three-way switch, KYW presented the big show performance far beyond both coasts, sending forth side show and menagerie "High Lights" to give the typical big top atmosphere to the interesting achievement.

The Sells-Floto performance this season is unusually well adapted to radio, for a sextette of prima donnas, a chorus of several hundred tell the story of the introductory spectacle—"The Bride and the Beasts"—in song. The finale of the number, the unleashing of eighteen lionesses in a steel arena, in which the heroine of the pageant is "thrown to the beasts" gave the fans listening in a thrill, for the lionesses are thorough in vocal showmanship.

Calliope chants and elephant trumpeting preceded the booming measures of the spectacle, and traditional ringmaster's announcements added color throughout the broadcasting program.

Children on the radio were given a trip around the menagerie oval, for the microphone picked up the roaring salutations of all jungle beasts, the chattering of monkeys, the raucous sigh of the hippo and the laughter of hyenas, while the polar bears, en route to the performing arenas, staged an arctic hullabuloo unsurpassable in zoological discord.

W. H. McFarland, dean of "kid" show managers, toured the circle of freaks and curious peoples with the fans. Each platform was visited, and, after a rattling old-time introduction by the veteran impresario, the freaks greeted the fans. The wild man growled, the fat lady gave her weight and the colored minstrels strutted their bits. A darky quartet broke in at intervals with racing lilts of syncopated mammy stuff, and Captain Jacobs, "fearless lion fighter" fought the good fight for the sixteenth time that day. It was a joyous round of the "Annex of Wonders," and it abounded with good stuff for the radio. Switching to the big show, the broadcasters picked up the big animal acts with their snarling, roaring climaxes, the popping of pistols and the snap of double-lashed whips. The Sells-Floto mixed aerial, high school horse and hunt displays are featured by a singing chorus of some seventy men and women, and these proved choice numbers for the radio.

Westinghouse Station KYW is the first to broadcast a circus performance direct from the arena and the range of first class broadcasting material about the big show astonished the operators and the show folks themselves. In the new style of circus performance, where the value of saying it with song has been realized, the radio has a wealth of interesting subjects to put on the air. There is almost no limit to the program available. At any time there is opportunity for a minute bit of most absorbing descriptive work by the announcer, and the clown are ever ready to bring back the days of the talking and singing "joeys" for grandpa and stage a skit with loud horseplay for the children.

Although the circus is primarily an "eye" entertainment, there is a large amount of "ear" appeal—the speeches of the side show barkers, the ticket sellers, the peanut venders and the announcers, while the big show band, "playing the show" steadliy is always available. The circus has proved a fertile field for the radio, and Westinghouse Station KYW is receiving countless telegrams of congratulations for its discovery.

—o—

ENGLISH will become the language of the world because of radio broadcasting, in which the English-speaking peoples are taking the lead, says Guy E. Tripp, president of the Westinghouse company.

—o—

"MALACHI," asked Mr. Casey, can your woife cook as well as your mother did?"

"She can not," replied Malachi, "but, me friend, I never mention it, for she can throw considerable bether."

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CONTENTS

PAGE

The Morse Memorial Dinner 220

Heath's Telephone Circuit Diagrams 221

Magnetism and Electricity 222

Telephony Including Automatic Switching. By A. B. Smith. Still on the Wires 225

United States Military Telegraph Corps 226

Empire Wireless. Air Mail Beating the Telegraph. A Lost Opportunity ... 227

Radio Repeating and the Future of Broadcasting 228

Three Thousand Telegrams Sent Out. High Speed Radio Telegraphy 229

Facts About Electricity 230

Patents on the Vibroplex. A Different Word 231

Editorial Comment. Telegraph Service and Education 232

The Railroad-Telegraph and Telephone Section of the American Railway Association. Canadian National Telegraphs. Maybin Brown Killed by Train. James C. O'Leary Injured in Crash. T N T Steel Galena 235

Predicts Radio Aid to Sea Cable Work. Wireless Telegraphy Versus Submarine Cables 236

Personal. Postal Telegraph-Cable Company. Spring Dinner of the Magnetic Club. 238

Radio Corporation of America 240

Western Union Telegraph Company. Old Time Telegraphers' and Historical Association. Telegraph and Telephone Life Insurance Association 241

Morse Birthday Observed. Telephone Pioneers of America. Recent Radio Tournament. Wire Woman for Fifty Years 242

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THE MORSE MEMORIAL DINNER

THE Dinner was held in the grand ball room of the Hotel Biltmore, New York, on the evening of April 28.

It was the most magnificent and impressive telegraphic affair carried to a conclusion within the past twenty years.

The victuals were great, the music was the best in New York, the speeches were excellent and all of the Old Timers were dressed for the occasion.

Nearly four hundred persons were present, practically all of them Old Timers whose thumbs and index finger still bear the scars and callouses of former days.

At the speaker's table, facing the broadcast microphone, were celebrities such as Frank A. Munsey, Augustus Thomas, John Bassett Moore, August Hecksher and John L. Merrill.

President Carlton, of the Western Union Telegraph Company, and Edward Reynolds, operating head of the Postal Telegraph-Cable Company, as well as a dozen or more telegraph and cable company vice-presidents, sat at tables on the main floor in order to be "with the boys."

Richard E. Enright, police commissioner of New York, served as toastmaster and turned a pretty job. On a dummy circuit he showed that he retains a sending "fist" sure enough to send train orders on an iron wire during wet weather.

J. Frank Howell, Richard Spillane and J. B. Taltavall were so enthused they talked of perpetuating the evening in story, song and verse.

That dearest of the Old Timers, Charles Selden, was present, as were E. C. Keenan, C. A. Plumly, L. S. Wells, J. F. Caskey, J. F. McGuire and J. L. Niesse of the railroads.

It was the first time since old Magnetic Club days that the Lion and the Lamb, the Sheep and the Goats and the Big Pole and Little Pole minions sat down at table together.

The most impressive feature of the evening was Augustus Thomas' tribute to and characterization of the intelligence and character of those who in the past and who now direct the operations and destinies of the telegraphs of this country bequested to us by S. F. B. Morse.

At 9.02 p. m., the telegraph wires of the United States were silent for a period of two minutes as a tribute to the memory of Morse.

August Hecksher, the millionaire philanthropist of New York, demonstrated his ability to pound brass by transmitting on the dummy circuit a message of congratulation to the toastmaster.

The affair, a complete success, seems to have been motivated by two separate ideas. The Broker Telegraphers' organization, stimulated by J. A. Hickey's activity, a year ago launched the laudable program of annually decorating Morse's statue in Central Park ,New York, and of holding at various points throughout the country memorial services in honor of the great inventor. The big dinner at the Biltmore was in a way an out-growth of this movement and also of the plans for a New York Chapter of the Old Time Telegraphers' and Historical Association, conceived and fathered by Lee Lemon, Donald McNicol and Thomas E. Fleming.

Frank A. Munsey writes a good telegraph hand and promised to brush up on sending for the meeting to be held a year hence. He gave an interesting account of his twelve years telegraphing, starting in at Lisbon Falls, Maine and winding up as manager of the office at Augusta, Maine.

Mr. Edison, although unavoidably prevented from being present came in for no end of fine eulogy from Mr. Munsey and other speakers.

The tables occupied by the Postal Telegraph-Commercial Cable folks were surrounded by Edward Reynolds, W. C. Daviet, J. F. Skirrow, John Goldhammer, W. B. Dunn, W. J. Deegan, F. B. Gerrard and E. P. Tully.

The Western Union Telegraph Company was represented by a host of officials including, Newcomb Carlton, J. C.Willever, J. J. Welch, Col. I. D. Hough, L. McKissick, P. J. Casey, Lee Lemon, M. J. Hayden, J. R. Hyland, J. F. Nathan and George M. Yorke.

The All America Cables' representation included J. L. Merrill, J. R. Beard, Adam A. Cross, F. A. Pirie and W. Hannah.

The Radio Corporation was represented by E. B. Pillsbury, M. H. Payne, C. H. Taylor, T. M. Stevens and D. Saranoff.

At vantage points, here and there, were observed: C. C. Adams, J. J. Ghegan, Donald McNicol, A. P. Velie, John Morrison, H. S. Balliet, H. W. Henry, E. F. Howell, J. W. Hayes, F. J. Scherrer and Joe Mitchell Chapple.

Professor Morse's great grandson, Richard W. Morse, had a seat at the head table.

Among the others present were:—

Adamson, Robert, Allan, William, Allen, G. C., Allen, James A., Allen, William S., Austin, W. J., Allderdice, Norman, Allen, A. W., Aston, E. A., Abel, W. T., Adams, C. C.

Bornsack, C., Barlow, Charles E., Bearn, Major Benjamin S., Bronson, Miles, Bender, Louis, Balliet, H. S., Bannester, W. F., Bergen, D., Baumis, F. J., Brennan, Michael R., Brennan, Thomas M., Burleigh, A. F., Boucheron, P. H., Bucher, E. E., Bagnall, W. E., Burr, Col. N. B., Beard, J. R., Bliss, F. E., Bruns, Edward G., Brennan, Thomas, Batcheller, Arthur, Bullard, Maj.-Gen. Robt. L.

Creed, Jason S., Corwin, George W., Clarke, J. H., Cooke, Robert Greer, Casey, J. S., Cronen, Lieut. Arthur, Cadmus, R., Crawford, C. D., Campbell, J. F., Callahan, M. J., Coleman, William A., Callahan, Hubert, Cardona, J. J., Casey, P. J., Cohen, M. S., Coleman, F. A., Caskey, J. F., Canfield, Edward, Correll, C. D., Cohen, Dr. Harry A., Cross, Adam A., Cohen, W. W., Connick, H. D. H., Clark, Harold R., Curry, John F., Corrigan, John, Campbell, A. S., Crowley, Patrick E.

Dougherty, Horace N., Davis, R. H., Davis, J. M., Devery, Patrick H., Dearden, A. V., Daly, John, Deegan, W. J., Daviet, W. C., Dunn, W. B., Dierks, J. A., Doyle, James P., Davis, R. H., Davis, M. M., Dalton, Frank A., Diemann, John H, DeNaouley, George A., Devine, Patrick, Dunphy, John, Duell, Sackett, Dangerfield, Lewis, Dolphin, M. Martin.

Emery, J. E., Emery, Henry, Egan, W. H., Egan, J. I.

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Evers, O. J., Egan, J. F., Ermire, John, Escobar, Maria Louise.

Folley, L. B., Fripp, W. J., Fearons, G. H., Freedman, Daniel, Fitzpatrick, F. F., Finn, Francis J., Fleming, T. E., Folger, R. C., Fruhauf, Henry, Freedman, Daniel B., Fink, Valentine, Fallon, John, Flynn, Hon. Wm. J., Farquhar, W. ., Fisher, Edward F., Fahy, Walter, Forsyth, J. H., Fitzpatrick, Jas. J., Francis, Chas. E., Freeman, William.

Gallatin, Francis D., Goodwin, Arthur S., Gallagher, E. ., Goldhammer, John, Gerrard, F. B., Griffith, E. P., Greer, W. A., Ghegan, J. J., Gordon, Harry A., Glatzmeyer, Hon. August W., Gannon, J. W., Groser, C. B., Guggenheim, Hon. Edmond E., Grote, John H., Griffin, T. H., Guthrie, Harry B., Gallo, Fortune.

Hannon, Maurice, Harley, Francis C., Hughes, F. W., Herriman, F. E., Hughes, James L., Henry, H. W., Hughes, J. L., Henry Dominick, Hurty, J. M., Henry, H. W., Hickey, H. J., Hickey, J. A., Hynes, Lawrence P., Huntington, G. K., Hayden, M. J., Howell, E. F., Hyland, J. R., Hamblin, M. W., Howell, J. F., Hassett, Thomas, Henemier, Henry, Hamar, J L., Harriss, Dr. John A., Haggerty, Henry, Hannah, William, Haggerty, Joseph J., Haskell, Col. W. E., Hannah, W., Hearn, Cornelius, Jr., Hampson, Edward, Hayes, Joseph W.

Jones, F. W., Janney, J. R., Jarvis, W. L.

Knight, Wm. Thomas, Kennedy, J. S., Kohler, L. Frank, Killinger, J. H., Keenan, E. C., Kelly, L. A., Kober, C. W., Kelly, M. J., Kennedy, J. S., Kerr, D. A., Kenny, Patrick, Klein, Henry H., Kenly, Genl. Wm. L., Kelly, Michael R., Kauff, Geo. H., Kruse, Frederick C., Knox, John Clark.

Lewis, Lem. A., Lemon, Lee, Lyons, Hon. John J., Lewis, H. E., Leach, Edward, LaFour, Louis E., Lawton, Col. Frank H.

Mehan, M. J., Metz, Hon. Herman A., Moffatt, E. B., Moore, C M., Meadowcroft, W. H., Marr, L. K., Marsh, F. J., Marr, B. H., Mitchell, J. F., Murphy, E. H., MacKenzie, James, Maguire, J. F., Murphy, C. H., Murphy, R. J., Morrison, John, Merritt, C. E., Mulholland, Dr. Joseph A., Midgley, Henry F., Morgan, James J., Morse, Richard W., Metcalfe, Mort. D., Mand, George F., Moore, John Bassett, Meehan, Alfred L., Miner, Charles, Manson, W. B., MacDonald, George, Matthews, William, Magee, J. M., Martin, J. J., Middleton, A. W., MacDonald, Geo.

McCann, John, McAndrews, Thomas, McKinney, Charles H., McConaughy, C. J., McNicoll, H. B., McGrath, William J., McKisick, L., McNicol, D., McChesney, H. C., McRobie, John, McCooey, Hon. John J., McCaffrey, Neil, McQueeney, Henry, McLaughlin, R. E., McMahon, Jos. F.

Nicholson, Alfred, Nathan, J. F., Nicholson, Hon. George P., Nevins, John T.

Overdorf, W. L., O'Gorman, Joseph F., O'Connor, Bernard, O'Brien, John, Owens, Benjamin C., O'Loughlin, J. W., O'Kane, Thomas H., O'Brien, W. J., O'Neill, Patrick, O'Connor, Daniel F., Onofrei, Demetrio, Owen, J. Cunliffe.

Pershing, James F., Pollock, J. R., Pascoe, H. J., Pillsbury, E. B., Porter, G. H., Payne, M. H., Phelan, J. M., Plumly, C. A., Postlewaite, C. E., Pedrick, Wm. J., Peck, J. C., Pirie, F. A., Piper, G. S., Pollock, J. R.

Reed, Charles, Ryan, Col. Matthew W., Ryan, Rev. Leo H., Robinson, L. A., Reynolds, Edward, Ross, C. J., Rostron, J. B., Reid, John, Rieners, Emil H., Riordan, James J., Rodgers, E. H., Reynolds, B. H., Rayens, M. W., Rawson, P. B.

Smecker, L. A., Sullivan, Fred, Shaw, Hon. John M., Shipman, Rt. Rev. Herbert, Starbuck, R. D., Stephenson, E. F., Smith, C. F., Spencer, C. E., Spencer, G. F., Smith, Hon. R. A. C., Sutliff, William R., Skehan, James A., Stevens, T. M., Spillane, R., Selden, C., Scherrer, F. J., Sawyer, W A., Summers, L. L., Smith, C. G., Smith, Clifford W., Steingut, Hon. Irwin, Schoen, William P., Scott, Col. Walter, Stevens, H. F., Seaman, A., Sanders, Samuel, Sherwell. Dr. Samuel, Straub, Fred, Smith, Lyman D., Springer, Walter.

Tisdale. G. A., Towne, F. W., Tierney, F. A., Titley. W. C., Thornburgh, E. D., Tully, E. P., Taylor, C. H., Tilghman, C. R., Tranter, Sefton, Taltavall, J. B., Twomey, Jeremiah F., Taylor, Samuel W., Tonjes, John, Traub, Genl. Peter, Taylor, Captain A., Travis, H. R.

VanNest, B. W., VanKueren, W. H., Voorhees, C. S., Velie, A. P., Valk, Francis M.

Willadsen, S. J., Wishart, W. C., Williamson, F. E., Whiting, Frank V., Williamson, F. E., Willever, J. C., Welch, J. J., Waters, W. P., Weiderman, George, Waterman, Joseph A., Waite, Judge C. E., Wooden, William H., Washington, Lamar, Weaver, E. M., Wells, L. S., Wright, W. J., Waldo, Col. R., Weisel, Edwin, Weeks, Arthur, West, Edwin H., Whiting, Frank V., Weigel, Brig.-Gen. Wm., Yorke, G. M.

Heath's Telephone Circuit Diagrams

HEATH's Telephone Circuit Diagrams, price $2.50 per copy has just been issued by the McGraw Hill Book Company, and copies may be obtained by addressing Telegraph and Telephone Age, 253 Broadway, New York. The book consists of 280 pages and measures seven inches wide by four and a quarter inches in length. Of course, it is oblong in shape and is brimful of excellent information for the telegraph, as well as the telephone engineer. The author is John M. Heath, 1st Lieutenant, Signal Corps, U. S. Army; Instructor of the Signal Corps Unit, Reserve Officers Training Corps, Massachusetts Institute of Technology, Cambridge, Mass. The author says in regard to the book: "No attempt has been made herein to write a treatise on Telephony. Let it be said at the outset that the circuit diagrams and their manner of arrangement are the predominating features.

The diagrams have been worked up and arranged in a logical and progressive manner along lines parallel to the development of the art, so the primary object of these notes is to give an explanation of each diagram in its present arrangement. In this way it is felt that the student cannot help but grasp the subject as a whole when he once understands the component parts.

In my early years of practical telephone experience, time and time again I felt the need of some kind of small handbook that could be carried around in the pocket, to which I could refer at frequent intervals to gain a better understanding of the working of the various units in a telephone system. It was with this thought in mind that this book of diagrams was complied and the explanations written.

As mentioned above, this is not a treatise on Telephony. It is, however, a careful and detailed compilation of the circuits which comprise a telephone system, and the explanations tell how they work. It should be of greatest value to the telephone man to know how a circuit should work, and after he has a clear understanding of how it works, trouble-finding is a very easy matter."

A. M. BARNES, manager of the Postal Telegraph-Cable Company, Muskegon, Mich., writes: "I would not wish to be without the Age. It is so instructive. It contains interesting reminiscences of bygone days and is full of good suggestions for the future."

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Magnetism and Electricity

MAGNETISM, like electricity, is another perplexing mystery, and is the actuating agent in the operation of all telegraph apparatus. It can be controlled, however, and its strength measured with accuracy. Its action is such that it is usually described as lines of force which travel in circles and try to make their route as short as possible.

It is due to this tendency to contract, like an expanded elastic band, that other particles are attracted to the metals through which the magnetism is circulating. For this reason bars of iron and certain minerals containing such lines of force are called magnets. Those possessing this power of attraction which have been found in the natural state, such as loadstone, are called natural magnets in contradistinction to those artificially made by an electric current.

Magnets possess some very curious and remarkable properties. If made in the shape of a bar the route of the magnetic lines of force may be observed by placing a very thin layer of fine iron filings on a piece of white cardboard and then holding the bar magnet beneath it. The small particles of iron will be attracted by the magnet, but as they cannot reach it, will arrange themselves along the route of the active lines of force.

It will be seen that their apparent aim is to get to the opposite end of the bar, but air offers such a poor route in comparison to iron that few succeed in reaching that point. If, however, the bar be bent in the shape of a horseshoe, so that the two ends are brought closer together, the strength of the magnet will be greatly increased, because the lines in returning will have a much shorter air gap to cross.

A curious feature of these lines of force is that practically nothing can stop them when once they start to reach another piece of iron which happens to be near. They will pass through wood, brass, paper and nearly all known substances without the slightest apparent difficulty. This can be shown by placing a piece of paper or anything else between the armature and core of a relay magnet. The instrument will work without interruption. With an electric current, however, it is different. Insert a piece of paper, wood, or anything of that nature, between the local contact points of a relay and the sounder instantly ceases to operate.

Another wonderful property is the power of a magnet to magnetize other pieces of metal without losing any of its own magnetism. Draw a bar of hard iron or steel across the end of a magnet several times and it will be found that it will then have become a magnet itself, capable of imparting similar properties to other like metals in turn, if treated in the same manner, yet neither magnet will apparently have been weakened. Draw a knife blade across one core of the relay several times while the circuit is closed, and it will be found that the blade has become a magnet and will pick up a steel pen, while the steel pen itself (now a magnet) will take up a second, and this in turn a third pen and so on until the full lifting strength of the magnetism in the knife blade is reached. If the blade is of good steel it will remain a magnet for a long time. The softer the steel, the sooner the magnetism will disappear. If the blade should happen to be made of pure soft iron, it would only remain a magnet during its actual contact with the original magnet. This fact should not be forgotten, for it is due to this that we are enabled to manipulate at will the armatures of relays and sounders.

A third property of the magnet is equally wonderful. If the end of a bar magnet be placed in proximity to a steel pen that has previously been magnetized it will be found that one end of the bar will attract it, while the other end will repel it. These adverse properties are called the two poles of a magnet—positive and negative—and their attractive and repellant action suggested ideas which finally led to the development of the polar duplex.

It has been stated that magnets developed by an electric current are called electromagnets. As they are the controlling elements of all telegraph and other apparatus for signaling purposes, let us see what part they play in our own work, and from the foregoing outline of electricity, trace the development of an ordinary single relay or sounder.

If the actual condition of a wire carrying a current of electricity could be seen, it would appear to be encircled by innumerable little rings. These rings are the lines of force, which always accompany electricity in motion. They are the energizing elements of a magnet and are constantly on the outlook for a better medium than the atmosphere in which to circulate.

Now, it has been shown that electricity will move in any direction where an opportunity is presented; that it carries with it magnetic lines of force; that these lines seek iron above all else as a medium to pass through and having once entered the iron that metal becomes a magnet capable of attracting other pieces of iron; and that the lines of force invariably take the shortest route available.

With these facts in mind, observe closely their application in an ordinary telegraph circuit and note particularly the construction of the relay magnet.

The current, starting from the main battery passes along the conducting wire and enters the relay at one post. After circulating around the iron cores, which are shaped practically like a horseshoe, it makes its exit through the other binding post. The magnetic lines of force in the relay coils finding themselves so close to the iron core immediately seek this, their favorite medium, and circulate through the entire mass, thus creating a magnet of it. The relay magnet thus created then attracts the small bar of iron attached to the upright piece of brass, which in turn acts as a key to the sounder circuit.

If a current is passed through a few turns of wire encircling a ring of iron the magnetic lines of force

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will pass around the circle without being able to escape. Even should a small bar of iron be placed near it, the intervening air gap would practically prevent any escape. But if the ring is cut, the action is different. The magnetic lines of force will divide between the two air gaps, the greater number taking the shortest route.

Thus, by purposely making the space between the two cores of the relay very much greater than that separating the magnet from the armature, it will be possible to pull the latter over to the local contact points through the contracting tendencies of the lines of force, acting like elastic bands, whenever the key is closed.

Now comes the secret concerning soft iron. If the relay cores were made of steel or hard iron, they would attract the armature and close the relay points, but when the current is removed by opening the key there would still remain a strong tendency to hold on to the armature, because the steel would then have become permanently magnetized. But as pure soft iron loses every trace of magnetism the instant the current is removed, the armatures of single line relays are made of that metal and their operation is simply a matter of opening and closing the key.

Before continuing the description of telegraph apparatus it will be necessary to pursue the subject of electricity further in order to better understand its application.

The idea seems to prevail in the minds of many that this mysterious force, like wine, possesses various degrees of quality. In fact the writer has more than once been asked, "Which is the best kind of electricity?" On being assured that the electric fluid (if we may call it such) is at all times of one and the same quality, irrespective of its source, or application, the answer is usually followed by the second question, "Then why isn't one battery as good as another and as available, provided we use a number of them?"

Now as far as electricity itself is concerned there is no difference, but unfortunately for smooth sailing our Creator has seen fit to instill within all things a spirit of rebellion or opposition to being disturbed or diverted from its natural sphere. Beginning with an example in Holy Writ, our endeavors to be good are opposed by evil temptations.

The turn of a hand or the thought of a dear one brings destruction and death to some portion of our physical being, yet that atom does not give up its life without a struggle. Disease is but the triumph of opposition over the effort. This law also holds good with batteries, and explains their various degrees of efficiency. Batteries having the least inward or internal opposition can certainly do more work externally than others whose energies are principally expended fighting opposition or disease within their respective cells.

All cells which generate electricity by chemical action within themselves are called galvanic cells, and voltaic cells, in honor of Galvani and Volta. Galvani noticed that when two dissimilar metals like silver and copper were placed on a frog's leg, one on the muscle and the other on the nerve, the leg, when the two metals were connected, would contract violently. He supposed the power came from the frog's leg, but Volta demonstrated that it came, not from the leg, but from electricity generated by the contact of dissimilar metals.

Those pieces of silver and copper with the frog's leg for a conductor, therefore, formed the first chemical battery.

Place the tip of the tongue between a silver quarter and a large copper cent made into a V by touching the edges of the coins together at one point, and the peculiar taste experienced will denote the presence of an electric current. Remove one of the metals and the disagreeable sensation will cease. Here you have the simplest, yet a complete, type of a galvanic battery. All battery cells are but chemical and constructive improvements for getting more current out of them.

As has already been stated, electricity can be obtained only by disturbing its equilibrium and by catching it as it attempts to return to its former repose. It has been found that nearly all expenditures of energy develop electricity in a greater or a less degree. It manifests itself in the shape of two distinct and directly opposite forces which face each other like soldiers in line of battle. One is called positive and the other negative electricity. They are usually designated respectively by the signs + and —.

Their inclination is to "return" to each other. If a path is provided they will reunite instantly. If, however, the energy that separates them is kept constantly active and the two forces are then connected by a small piece of wire, there will be a continuous procession through the metallic route from the positive connection to the negative end as long as the energy is kept up. These moving particles, or whatever they may be, produce in the connecting wire a condition which we designate as a current of electricity, and their number will be in proportion to the chemical activity of the battery cell.

It is plain, then, that in order to utilize this current it is only necessary to run wires from these positive and negative elements to any point desired. Electricity is very obliging and as it travels at a speed that would carry it around the earth nearly eight times in one second it does not mind a little excursion of four or five hundred miles into the country. This enables it to reach out in all directions regardless of distance. The earth is a great reservoir of electricity and an excellent conductor thereof, so that an electric current on reaching the end of its journey through a wire, or overhead route, simply takes an underground trip home via Mother Earth. When the return route is via a second wire the circuit is called a "metallic" circuit because the current flows through metal instead of partly through the earth. Single wire circuits are called "grounded" circuits.

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Now, although an electric current may be developed in many different ways, as for instance, through friction between the sole of your shoe and the carpet you tread on, between the two edges of a card torn asunder, and between the edges of any two articles coming violently in contact with each other, etc., something more continuous and steady must be found for practical use.

The remedy is found in the peculiar properties exhibited by dissimilar metals when placed in contact. The moment the connection is made the metals become highly electrified; the positive or + collect on one and the negative or — on the other. All metals are not equally potent in this respect; some are naturally highly positive and others negative in respect to each other. Therefore two metals possessing these opposite qualities in the highest degree are selected for the two electrodes of the battery. Copper and zinc have proved to be an ideal combination, both from a practical and economical point of view.

When the two plates are immersed in the liquid contained in the jar, no chemical action will take place until the zinc and copper are also connected externally. Directly the connection is made chemical action between the plates begins and a current of electricity is set in motion. In its passage through the cell, it decomposes the fluid; that is, separates the water into its original elements; hydrogen and oxygen.

In batteries where these separated gases have an opportunity to escape or are otherwise disposed of the current will be constant and steady; but where they collect on the plates and cover a portion of the surface, the energy is not only weakened by a decrease in the area of metal acted upon, but the gases themselves find an enemy and make an attempt to reach it. Unfortunately the direction is invariably in opposition to the force urging the current through the cell. In some batteries these opposing forces multiply so rapidly that they almost completely overpower the original force. When a cell is thus weakened it is said to be "polarized." This explains why dry batteries and many others used for electric bells, doors, etc., soon become weak if not promptly disconnected after use and allowed to recuperate. Batteries of this class for the same reason will not work telegraph sounders for any length of time, notwithstanding the fact that at the beginning they may be nearly twice as powerful as the reliable bluestone cells which have been generally used for telegraph purposes.

Some kinds of battery are capable of yielding in a short circuit larger quantities of current than others. Most of these are unsteady, and are rapidly exhausted through their chemical action. There are, however, quite a number which are perfectly steady and reliable. Quantity batteries, therefore, are those whose liquids offer very little obstruction to the passage of electricity through their cells, and permit nearly all of their energy to be utilized where it is needed—that is, outside of the cell. The value of such batteries will be better understood after electrical measurements have been studied.

It it now quite plain that in selecting a battery one should first ascertain what its requirements will be. If it is for the purpose of silver-plating or electric lighting, quantity and a steady flow of current must be secured. For telegraph purposes it must be constant but not necessarily of great quantity. The bluestone battery in general use gives a comparatively small quantity of current owing to the fact that in extremely short circuits over half its energy is expended within its own cell. This hindrance to the passage of the current through the liquid from the zinc to the copper plate is called the "internal resistance" of a cell. Such batteries will not do for electric lighting, but are highly efficient for nearly all telegraph apparatus, as the latter requires comparatively weak currents. Nearly all standard books on electricity give a full description of the chemical ingredients, composition and general features of the principal batteries in use. Dry details would hardly interest the general reader.

Particular attention is called to the words "positive" and "negative" in their application to external circuits. Students are very likely to wonder why we supply a telegraph circuit from the wire attached to the copper plate of a battery when a positive current is desired, and vice versa for negative, after having just been told that the zinc is the positive plate and the copper the negative.

If the reader will always think of a positive or + current as moving away from the battery and the negative as returning to it (even if it has to come up out of the ground miles away), he will never be at a loss to answer the question, "What polarity have you to the line?"

It must be remembered that the current starts from the zinc (which is eaten away) and, therefore, makes its exit at the binding post of the wire attached to the copper or negative plate; hence, positive means copper to the line and negative, zinc.

It has been stated that in order to obtain an electric current, electricity must be put in motion, and we have shown that the chemical action in a cell of battery will do it. There is, therefore, something in every battery urging the current forward. This agent is called electromotive force. Its ability to overcome the resistance, which conductors offer to the passage of a curent, is called its potential, and this degree of intensity or "pressure" of electromotive force is expressed in volts or fractions thereof. The Daniell and the ordinary bluestone battery cells, almost universally used for telegraph purposes, have an electromotive force or "pressure" of a little over one volt each. It is so near that figure, however, that should any one ask what voltage is being used it would only be necesary to count the number of cells of the battery supplying the circuit referred to and give the sum total as so many volts. Hence, the figures expressing electromotive force, voltage, and number of cells are practically the same when used in connection with tele-

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graph circuits supplied by the standard bluestone chemical battery. The size of the cell has nothing to do with its electromotive force. That matter is regulated entirely by the wide difference in the electrical properties of the zinc and copper plates. One reduced to the size of a thimble and another enlarged to the proportions of a flour barrel, if made of similar materials, will possess equal electromotive force, and if connected to a very long circuit, prove almost equally efficacious for a short time. However, if the external circuit should be very short, that is, of low resistance, the usefulness of the smaller cell would be greatly curtailed. This statement is greatly perplexing to students, for it seems almost beyond belief that, while the smaller cell is capable of producing practically equal strength of current with the larger cell, where the distance is abnormally long and the work to do very great, it still can not make even a respectable competition in a very short circuit.

The explanation is found in the fact that the internal resistance of the cell forms part of the total resistance in the circuit, and that the smaller the cell, the greater will be the internal resistance. In fact, the resistance in a cell is principally measured by the size of the copper and the zinc plates, other conditions being equal. It therefore follows that although the smaller cell must necessarily possess a much higher resistance than the larger one, it still adds comparatively little to a long wire. Even if we counted the resistance of the large cell as nothing, the difference between the total obstruction in either case would hardly be noticeable. Hence, one volt from either cell should give nearly the same current, as they have practically the same work to do.

Now, see what happens when we substitute a very short wire of low resistance. For illustration, let us suppose that the internal resistance of the larger cell equals that of one mile of wire (of course it does not in fact), and the smaller cell ten miles of wire. If we connect the smaller cell to a short wire, say, one mile in length, its pressure of one volt will have a total of eleven miles of obstruction to overcome, whereas the larger cell, similarly connected, would only be opposed by two miles. In other words, ten-elevenths of the energy in the smaller cell would be doing work within the jar, leaving but one-eleventh of the energy for the external mile of conductor. The larger cell would have half of its total energy available after overcoming its internal resistance. The importance of the internal resistance of batteries, therefore, should not be underestimated, as it enters into all calculations pertaining to the measurement of currents. The detrimental effect of internal resistance is such that practical electric lighting was held in check by it for many years. The principles governing the electric light and horseless carriages were known years ago, and actually exhibited as expensive luxuries long before most of us were born, but it was not until the inventions of the electric generator and the storage battery that either became a practical or financial success. Storage batteries and generators, having no appreciable internal resistance, give nearly all of their entire energy to the useful external service required of them.

Telephony Including Automatic Switching

By

ARTHUR BESSEY SMITH, E. E.

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INDEX

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Still on the Wires

MR. HARTSHORN, the postmaster general says there are 10,000 telegraph lines in England, over 1,200 terminating in the Central Telegraph Office, London. It is entirely impracticable to replace this system by wireless.

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United States Military Telegraph Corps

THE following correspondence explains itself:—

April 22, 1924.

Hon. Nathaniel Barksdale Dial,
United States Senate,
Washington, D. C.

Dear Sir:—

The National Tribune, March 20th, contains your speech on the floor of the Senate which has so many imperfections as to the service of the United States Military Telegraph Corps of the Civil War as to demand authoritative contradiction. Born in 1862, you cannot know of the Civil War excepting from official records to which you have evidently not referred. Let me give you some accurate data.

(1) Calendar No. 557—Senator Spencer's fine report on our Bill in the 67th Congress identical with Vice-Chairman McKenzie's report from the House Military Committee on a similar bill—copy enclosed.

As a native American your eyes ought to fill with tears while reading this report.

(2) Plum's "History of the United States Military Telegraph Corps," obtainable from the Congressional Library. This report is a mine of information for all students of the Civil War period.

(3) Duke d'Orleans report to his Government on his service with General McClellan in 1862, obtainable from Congressional Library. Among other things this volume tells of the service at the risk of their lives of members of our Corps in the swamps of your native State keeping up communication with General Gillmore's headquarters.

(4) The reports of General Grant and the leading Federal Commanders of Army Corps, obtainable from the War Department or Congressional Library. Most of these reports refer particularly to the Military Telegraph Corps as having rendered invaluable service at the risk of the lives of our members. General Grant's Memoirs obtainable from the Congressional Library, Volume 2, page 207, eulogizes the service of our Corps. Grant's comment being that they were so efficient that every night at the close of the day's march, he was in instant communication with the Officers of the Army Corps under his command, and "that no orders ever had to be given to establish the telegraph." He tells particularly of the work of our Corps—how it was carried on at the risk of the lives of its members.

Your speech would indicate that our Corps was made up of "post hole diggers." My records contain the name of only one post hole digger—Clinton W. Gulick, White River Junction, Vt. He was a personal friend of General Grant, and of President Lincoln, the latter whom he met on his several visits to Grant's headquarters. The bulk of our members was composed of telegraph operators and cipher operators. We were not allowed uniforms because President Lincoln decided it was too great a risk to have our cipher codes subject to superior officers of the army—therefore we were not uniformed and over 200 of our members were captured by the Confederates and many of them tried as spies because dressed in civilian clothes. Many of them died in Confederate prisions.

(5) One of our number, Colonel William Bender Wilson, was awarded a gold medal by special act of Pennsylvania Legislature for his service in 1863 in entering the Confederate lines at the risk of his life, to obtain needed information for Governor Curtin and our War Department.

(6) Another member of our Corps. Major Joseph O. Kerbey, spent several months in Richmond in 1862, at the risk of his life obtaining information needed by our War Department.

(7) Three of our Corps, the writer among the number, unravelled a Confederate cipher despatch addressed to an Agent in Halifax in December, 1863, telling of the intention to capture two ocean liners by conspirators sailing as passengers. Assistant Secretary of War Dana went to New York, December 23, 1863, and the following day, General John A. Dix captured most of the conspirators and prevented the seizure of the ocean liners. See Harper's Magazine, June, 1898. See also "Lincoln in the Telegraph Office"—Bates (Century Co., 1907.)

(8) Two of our number rode all the night of June 30, 1863 by different routes through enemy's lines from Frederick, Md., to Gettysburg, with Secretary Stanton's dispatch to General Meade, telling of General Longstreet's whereabouts enabling Meade to move his Army at once to attack Lee and win the battle that would probably otherwise have been lost.

Over 60 of the sons and grandsons went to France with Pershing. Two were killed—One Lieut. Scott McCormick was the grandson of Ten Eyck H. Fonda, who delivered the dispatch to Meade 54 years before that gave us Gettysburg.

These are the men, my dear Senator, you have unwittingly maligned and these are some of the heroic deeds performed by them in helping to save our country at its most critical period.

With the foregoing official testimony at your demand, you will surely not again malign our little Corps.

I am sending a copy of this letter to some of the Senator's who heard your speech.

Yours very truly,

D. H. BATES,
Secretary.

New York, May 3, 1924.

Hon. Nathaniel B. Dial,
U. S. Senate,
Washington, D. C.

My Dear Sir:—

Referring to the subject of my previous letter, please add the following item:—

The crowning event showing the great confidence the Federal Government had in the United States Military Telegraph Corps is the fact that in January 1865, President Lincoln appointed Major Thomas T. Eckert, the Chief of our Corps to represent him at the meeting with the Confederate Peace Commissioners at City Point and Hampton Roads.

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Lincoln's message to Congress February 3, 1865, ls with what fidelity Major Eckert fulfilled this portant mission.

Yours very truly,

D. H. BATES,
Secretary.

EMPIRE WIRELESS

Donald Committee's Report

THE EDITOR OF THE TIMES.

Sir,—As one who was associated with the very st wireless inquiry and a close student of the prob- n of inter-Imperial wireless ever since, I should e to express warm satisfaction with the able and eedily produced Report of the Committee re- tly presided over by Robert Donald.

From a purely public standpoint, it has always en a matter of surprise to me that similar con- sions have not been arrived at sooner. From this nt of view, what are the considerations involved? e they not mainly (*a*) national and Imperial, in- ding strategic requirements; (*b*) Service effi- ncy? State control can, in my opinion, alone be ied upon to secure the first, and where the inter- s of private enterprise unfortunately, clash with ate requirements, the latter must of necessity evail.

The same difficulties have arisen with inter-Im- rial cable communication. A notable example was e "All-British" Pacific cable. This line was badly eded for Imperial and strategic reasons. The cable mpanies were unfavorable to such a route, be- use, though of great value strategically, it was not e that ensured material commercial profit. The line d, therefore, to be undertaken conjointly by the me and Dominion Governments concerned. In- ently, it not only justified itself very fully during- e war, but is now a highly satisfactory enterprise mmercially. All communication should surely be garded, in the first instance, as a public utility and its value to the country for purposes of defense. The further consideration is efficiency of service, sed on technical efficiency and administration. nder both these heads the Marconi Company has ined a high reputation, and has accordingly the vantage of a good start. But have we arrived at e limit of "wireless" possibilities? On the con- ry, is not radio-telegraphy still a growing art? hile I can claim to be one of Senator Marconi's eatest admirers, it seems to me that the State ould encourage, rather than otherwise, all British ventions. Surely Government control of inter- perial wireless would favor such a policy more n an inter-Imperial wireless system in the hands any single company.

I am unwilling to believe that success can only be hieved by the Government placing its sole faith in y single commercial interest. That would entail noring the Post Office Radio-Research Board and e various corresponding technical committees of e Service Departments, all of which are disencum- red with individual commercial interests, and have only the country's interests at heart.

The suggestion that if the recommendations of the Donald Committee are followed up it is highly possible that inter-communication will be impossible with Marconi stations forcibly reminds me of the statements by the late managing director of the Marconi Company at the said first wireless inquiry. The suggestion was that Great Britain should abstain from joining the International Radio-Telegraphic Convention, one reason being that it would be physically impossible for a ship installed with the Marconi system to intercommunicate with a ship installed with some other wireless system. The accuracy of that suggestion has, of course, since been disproved times out of number.

I have the honor to be, Sir, Your obedient servant,

CHARLES BRIGHT,
The Athenæum, March 1.

Air Mail Beating the Telegraph

IT is announced that the International Telegraph Union, Berne, has proposed the holding of a world inquiry into the growing neglect of telegraphic facilities both internally and internationally. It is pointed out that in some countries, such as the United States and Scandinavia, the telegraph is now handling only one per cent of the total number of communications, and in France where some lack of enterprise is painfully apparent, the proportion is ten percent; over forty per cent of the 36,000 French communes being unserved by the telephone.

The air mail is declared to becoming a powerful rival and that a letter posted in Paris at 7.50 p. m., is now delivered in Casablanca, Morocco, on the following morning but one, which is sometimes, not always, as rapid as the telegraph and has of course, several important advantages.

During a single month last year, 200,000 communications were sent by the air route and it is suggested that if the telegraphs and cables, representing many millions sterling in capital, are not to be gradually scrapped, rates must be reduced and the telegraph service speeded up. In France, it often occupies five hours for a telegram to travel from Paris to Nice, while in Great Britain as already pointed out in these columns, it is quicker to send a message from London to Manchester via New York, than on the direct Post Office route between the two cities.

A Lost Opportunity

CHAUNCEY M. DEPEW recalls that away back in the eigtheen seventies, Alexander Graham Bell offered him a sixth interest in the telephone for $10,000, but unfortunately the president of the Western Union Telegraph Company at that time warned him that the telephone was only a toy and would never be of any practical use. Such are the mistakes made by shrewd but unimaginative business men. The venerable Chauncey says that if he had invested he would have made $150,000,000.

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Radio Repeating and the Future of Broadcasting

In a recent interview H. P. Davis, Vice-President of the Westinghouse Electric and Manufacturing Company, universally known as the "Father of Broadcasting," made public a plan for world-wide programs combining all the modern engineering achievements of radio transmitting and forcasting the marvelous development radio will make in the next few years.

The plan Mr. Davis proposes makes use of radio repeating, eliminates interference possibilities and shows, how, in the near future, the radio listener will be enabled to hear programs from London, Paris, Tokio, in fact any part of the globe, with the same ease as programs from local stations are now heard.

The plan shows a marvelous vision for the future of radio and indicates how radio will eliminate time and distance.

In detail it follows:

"In the past few months, the public has heard much regarding radio repeating without realizing, perhaps, just what this extraordinary achievement of radio engineering means to the future of radio. If the public knew that, when the first radio repeating was successfully accomplished, the entire course of future radio development has been changed and the practically unlimited possibilities of radio broadcasting had at last been opened, it would have given the idea even more attention than was granted when it was announced.

"Radio repeating is the 'open sesame' to world-wide wireless and will make possible the receiving of programs from any part of the globe, with the same ease with which we now hear programs from stations located only a few miles from the radio receiver.

"Naturally, before world-wide wireless is a reality, there will have to be installed special stations in various parts of the globe and these stations must be located advantageously.

"Radio repeating when it was first successfully accomplished by the Westinghouse Company was the outcome of the development of short wave transmitting. Short wave transmitting means the sending of radio signals on a wavelength of 100 meters or lower. Because this wavelength is so low, it is not heard on the ordinary receiver and we, therefore call it the inaudible wave. The ordinary broadcasting wavelength band for 250 meters to 600 meters is heard, of course, on the ordinary receiver and is termed the audible wave. Inaudible wave transmitting forcasts the following radio development.

"Certain well-designed central stations will be located at the world centers. These stations will be equipped to transmit on the audible or the inaudible wavelength or both as desired. The audible wave transmitter need not have excessive power, so that it's operation will not interfere with distant tuning by adjacent receivers if received. These transmitters will not need any more power than have the leading stations of the United States today. The inaudible transmitters, however, mayb highly powered to give them the ability when neces sary to maintain a constant range. As their signal will be transmitted on the inaudible wavelength the power used will not cause interference with re ceivers.

"There will be located, at advantageous points, inaudible wavelength repeating stations whose sol duty it will be to receive these inaudible wave from the central stations and pass them along. Thes repeating stations will act as "booster" stations t amplify over and over again the inaudible signals

"Certain other stations, and there may be as man of these as desired, will be equipped with short wav receivers with which it is possible to pick up th short wave signals and repeat them on a low powe audible wave. These stations which are to serv local districts only, will merely repeat the signal caught on the low wavelength and rebroadcast then for the benefit of the listeners in their immediat vicinity. These local broadcasters, therefore, nee only a small amount of power. This inter-connecte international system will have a despatching organ ization to direct how and when the various pro grams of the central stations will be sent and wha stations should stand by to handle the program circuits.

"Such a system will also need a world-wide an very efficient program-collecting organization This program organization will be operated some what in the manner of the great news agencies o today, and will continually be on the search for in teresting programs from every point in the world

"A famous statesman—a world-wide figure o interest is speaking in Paris. He faces the micro phone which leads to the station located at one o the central broadcasters. This central statio sends out his speech on the audible wave which ca be heard on the ordinary receiver operated in th district surounding Paris. Then, if desired, the in audible wave transmitter also sends out the speec for world-wide transmitting.

"The despatchers have selected the route fo transmitting the 'booster' stations who by prear rangement pick up the inaudible wave coming fro Paris. These stations will then 'boost' the inaud ible Paris wave so that anywhere in the world, a has previously been determined, it maybe receive on the short wave receivers of the local broadcast ing stations.

"In Pittsburghs, KDKA, being equipped with short wave receiver could pick up these repeate short wave Paris signals and repeat them throug its own transmitter with the result that everyon within the range of KDKA's signals could hear th Paris speech with receiving apparatus no mor sensitive than is required to pick up the broadcast originating in KDKA's studio.

"Perhaps, an event of the world-wide importanc takes place in Pittsburgh. KDKA could duplicat the inaudible wavelength transmitting and the dis patcher would instruct the 'booster' station to sen along only KDKA's inaudible wavelength signal

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Thus this station's program would be the one that would be repeated by repeating stations located at any prearranged points on the globe and the signals could be received in Shanghai, San Francisco, London and Sidney, Australia, with the same intensity as signals are now received when transmitted by stations located at those points.

"This system means world-wide radio and it also means less interference to the radio listener for with a selective receiver, he could still hear long distance stations even though the local station should be repeating a London program picked up from the inaudible wave source."

Three Thousand Telegrams Sent Out In Connection With Annual Sale Bring Big Results

It cost a well known New England store in Boston more that $870 to send something over 3000 telegrams to its customers on the occasion of its recent 12th anniversary sale, in addition to the heavy newspaper advertising which was used for several days previous, including page and double page spreads in the Sunday newspapers.

There are 27,000 accounts on the books of the concern. It seemed impracticable, as well as unnecessary to send telegrams to all of those people. So the books were gone over and those customers selected who seemed, from the conditions of their accounts, to be good prospects. Not the largest accounts were, selected, nor the most active, in all cases, but those that were in a healthy condition and promised to be prospects for further sales.

To these the telegrams were sent—in every case a bona fide message that went through the usual course to reach its destination. Copies were supplied to the telegraph company, with the list of names, and the work was districted, the messenger boys working in groups under the direction of district managers and assistants and messenger captains.

The sending was timed to reach customers at a receptive hour, in the late afternoon, and especially between 6:30 and 7:30. The company was instructed in no case to deliver after 7:30, for the store management did not want to have people startled, worried or routed out of bed. It was figured that late afternoon or dinner-time delivery would catch at least one of the family at home and insure absolute contact at a time when the matter would be discussed and the buying planned. A telegram would receive attention and discussion where a letter or series of letter would have only casual attention.

To many people receiving a telegram is some thing of an event which does not occur very often. The average business man receives many of them in the course of a day at his office, and they do not impress him as they do an ordinary householder. But even he, receiving one at his home after business hours, would be likely to comment upon the innovation and give it more attention than he would down town.

All these psychological effects were carefully reasoned out. The telegram was simply worded, and read just as though it were an afterthought on the part of the store management to impress upon the customer to come early for the best selections of merchandise that was especially priced and selected for this sale:

"Our twelfth anniversary sale starts Monday. Positively biggest sale in our history. Sunday newspapers tell the story. As a valued customer of this store, we are spending money for this personal message to give you last minute reminder this is your opportunity. Come early for best selections."

In only a very few instances was there an unfavorable reaction. Some few people were startled, fearing, before they read the message that it was of serious import. One man returned his telegram with the indorsement: "This 'April Fool telegram' has cost you one customer," but these instances were rare.

Saturday was selected as the best day for this, as telegraph business is unusually light on that day and extra messenger help could be secured for delivery. It took several hundred girls in the main telegraph office and branches practically all day and up to 7 o'clock at night to get them off. Each one had to be handled separately, as a separate message, but this was done by telegraphing or telephoning the body of the message first and then giving the lists of names and addresses immediately after, since each message was identical with all the others. Every message went out on a regular company form, dated, checked and recorded as a regular message received in the ordinary routine, just as any commercial or personal wire is handled.

High Speed Radio Telegraphy

M. A. Noss, chief engineer of the Telepost Laboratories, New York, has developed a high speed radio telegraph receiving system which makes possible radio reception at speeds above one thousand words per minute. By means of recording adjustments reception may be carried on at any speed from ten words per minute upward.

The signals are received on paper tape and appear in simple dots and dashes identical with those appearing on Wheatstone received tape, except that instead of the marks being made by an inked wheel the employment of chemically treated tape permits the incoming signals in an amplifier circuit to register in dark lines easily readable.

The system embodies a static reducing feature which permits of receiving clear signals through severe static conditions.

At the present time radio telegraph transmitters are capable of sending at speeds only as high as one hundred and twenty-five words per minute, or thereabouts. As tube transmitters are further developed making possible transmitting speeds from 500 to 1,000 words per minute, the system invented by Mr. Noss should have a wide use.

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Facts About Electricity

THE Speed of the Current.—Many experiments have been made to determine the speed of transmission of the electric current or influence through a wire. The first measurement, made by Wheatstone in 1833, showing a speed of 288,000 miles per second, was taken as the speed of the current under all circumstances. Subsequent measurements, however, showed such variable results, that confidence in Wheatstone's figures was much shaken.

Thus, for land lines, we were without any reliable data until 1869, when Professor G. W. Hough of Dudley Observatory, and C. S. Jones of Albany, undertook a series of experiments to determine the velocity of the current. Mr. Jones, Manager of the Western Union office, by looping wires to Boston, Detroit, New York and Buffalo obtained circuits of sufficient length to test the question thoroughly.

As Grove battery was used, and the line-wire was galvanized No. 9 we had some data from which to draw satisfactory conclusions. On the 27th of May, Messrs. Hough and Jones obtained the following results.

Velocity per Second	*No. Cells of Battery*	*Length of Circuit*
10,200 miles	70	400 miles
20,000 "	160	400 "
29,450 "	295	400 "
18,200 "	295	1,000 "

Professor Hough remarks, in relation to the above results:

"An inspection of these results show at a glance, that the velocity increases with the number of battery elements employed; also, for the same battery it decreases with the length of the circuit."

From these figures we reduce these facts:

First.—That with a given resistance, the speed increases with the increase of the electromotive force, i.e., the power to overcome resistance and urge the current forward.

Second.—That with a given battery, the speed of the current varies as the resistance to be overcome in the circuit varies.

And these facts explain why Wheatstone obtained a velocity of 288,000 miles per second, when Hough and Jones show less than 30,000 miles as their greatest velocity. Wheatstone used a Leyden jar, discharging a current therefrom of the highest tension, and having but a half mile of resistance of circuit, while the Albany experiments were made through long circuits, with battery-currents of comparatively very low tension.

Effect of Atmospheric Moisture on Insulation.—The effect of a moist or dry atmosphere on line measurements is too generally overlooked, especially on lines insulated with glass. As an insulator, glass is probably the best in dry weather, as it is certainly one of the worst when surrounded by a saturated atmosphere. Being an excellent radiator of heat, the glass insulator readily gives it out to the passing breeze and speedily becomes cold, when the particles of moisture held in suspension in the air are deposited in a condensed form on the surface of the glass, thus forming a film of water, through which the current escapes.

Again, even with the most perfect insulation, with a saturated atmosphere, a line will show considerable general escape. Frequently, a lower degree of insulation is shown just before a heavy rain than after it begins falling. And although the most careful experiments fail to show any escape through the atmosphere from one particle of moisture to another, yet this heavy escape is often noted. When the rain begins falling, the moisture being condensed into drops, the continuity of the moisture seems destroyed, and the escape consequently checked.

Whenever practicable, then, the percentage of saturation of the atmosphere, shown by a hygrometer, should be recorded, with the measurement, for future use, in comparing the condition of a line at different times.

Galvanometers.—A magnetic needle will be deflected from the north by a current of electricity flowing in a conductor placed parallel to it. If the conductor is placed on top of the needle, and parallel, when the positive pole of the battery is attached to the south end of the conductor, and its negative end to the north end, the current will flow northward, and the north end of the needle will be deflected to the left. Reverse the current and the north end will be deflected to the right. If the conductor is placed under the needle, the action will be in the reverse direction.

The degree of deflection will be proportional to the strength of the current.

If the conductor is carried over the face of the needle, and back underneath, the effect will be doubled. Wind the wire in several convolutions parallel to the needle, making a helix with the needle in the centre, and you have the strongest form of galvanometer. The finer the wire, and the greater the number of convolutions, the more sensitive will the needle be to the current passing through the wire of the helix.

Rheostats.—By using fine German-silver or silver and platinum wire, the resistance of which is not affected by changes of temperature, we may make a series of coils whose resistance is equivalent to that of any number of miles or fraction of miles. A number of these coils, arranged to be thrown in and out of circuit at pleasure, is termed a Rheostat.

Shunts.—It is sometimes necessary, in measurements, to divert a portion of the current from a galvanometer, to reduce the deflection of the needle within proper limits. In this case, a wire or coil of greater or less resistance is used, which is connected to both posts of the instrument to be shunted. The current will then divide inversely as the resistance of the two paths or routes open to it. Suppose a galvanometer coil to have a resistance of 99 ohms, and the shunt-wire of 1 ohm. Then 99/100 of the current would pass through the shunt

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wire and 1/100 through the galvanometer.

In this case, the result shown by the galvanometer must be multiplied by the shunt to obtain the correct answer—Haskin's Galvanometer.

Patents on the Vibroplex

SOME makers of telegraph apparatus have recently begun to advertise an inferior type of transmitting machine which they claim the right to sell because of the expiration of some of our earlier patents. We warn all operators not to be misled by such specious pleas, because, while some of our earlier patents have expired, we still own a number of patents covering our latest improved VIBROPLEX machines which have many years yet to run.

EARLIER PATENTS NOT MATERIAL.

For the last three or four years, since the expiration of the earliest Martin patent, it has been possible for anybody to make an efficient, semi-automatic sending machine. We have not been idle while our earlier patents have been expiring, but have made improvements on the VIBROPLEX machine, which are protected by later patents, and under which we shall seek injunctions against the latest infringers. As these patented improvements have been embodied in our latest types of VIBROPLEX machines, we have abandoned the older types of machines covered by the earlier patents. Others may make efficient sending machines, either by becoming "trailers" of Martin and this company and making types of machines which we abandoned some years ago, or else by infringing our later and still valid patents. Since their pride will prevent them from becoming "trailers" of Martin and this company, they prefer, apparently, to run the risk of becoming infringers.

LATEST IMPROVEMENTS IMPORTANT.

When it is remembered that an operator working continuously will in a few days operate his machine 1,000,000 times, and in a few weeks will operate it 10,000,000 times, the importance of an improvement which in any degree facilitates and lessens the labor of these myriad operations becomes apparent. Sufficient it to say that the latest patented improvements on our VIBROPLEX machines are so important that of the thousands of operators testing them every one without exception takes the new and avoids the abandoned type of machine. Indeed, we are selling thousands of the newest machines to operators and taking their old machines at a liberal allowance in part payment.

WARNING TO OPERATORS.

We warn all operators and others not to be gulled by the specious pleas of infringers. We intend in the future as in the past to protect to the fullest extent our rights as secured to us by all our existing patents. In all the suits prosecuted by us on our many patents in a number of the U. S. Courts we have been invariably successful. And when we obtain judgments against these latest infringers, as we believe them to be, we shall not be willing to grant any licenses for use of their infringing machines.

"VIBROPLEXES" AT REDUCED PRICES.

While we cannot reduce the price of our latest type of VIBROPLEX machine embodying the latest improvements below our regular price of $17.00, still, in order to assist operators who feel they do not want to pay that price, we make this extraordinary offer. We offer to furnish

A Genuine Vibroplex Machine for $12.00.

We will guarantee that each machine is in first class condition, is thoroughly efficient in operation, and is in every way as good and attractive a sending machine as it was possible for money to buy some three or four years ago.

THE VIBROPLEX CO., INC.
JAS. E. ALBRIGHT, *President*,
825 Broadway,
New York City.

A Different World

IF the reader grows dizzy with the host of changes that have taken place since The Journal's birth, it may be a kindness to him to sketch in thin and broken outline the scene on which the healthy infant of eighty years ago opened its eyes.

There was not at that time a railroad entering Chicago. The telegraph—folks were particular to call it the "electric telegraph" in those days—was just getting its first practical tryout at Baltimore. The slave-holding aristocracy of the South ran the nation, and expected to go on doing so. Texas had been annexed some years before; but California, Nevada, Arizona, New Mexico, Utah and most of Colorado were still under the Mexican flag; for the laurels of Taylor and Scott were still to be gathered.

Webster dominated the senate.. John Quincy Adams was the outstanding figure of the house of representatives. Tyler was president, and Polk the successful presidential candidate. Abraham Lincoln was beginning to acquire a local reputation for brains and reliability. Lowell, Longfellow and Poe were in their prime—three poets whom America has not yet surpassed. Prescott, Parkman and Motley were working diligently at their self-appointed tasks—three historians whom the world still honors.

Abroad, England was still a high-tariff nation; Louis Phillippe, the "citizen king," was reigning in France; Cavour was planning the liberation of Italy—though no one else knew it; Germany was beginning to feel the ferment which issued in unsuccessful revolution four years later, when the king of Prussia, offered the emperorship of Germany by the assembled liberals of the nation, replied that he would not take a crown from the gutter. How true to type those Hohenzollerns have been! Japan was still a hermit nation, and an emperor ruled in Brazil.

A different world, indeed, from the one in which we live today.—Chicago Journal.

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EDITORIAL COMMENT

Telegraph Service and Education

ALL steps taken toward bettering telegraph service should converge upon the common objective of increasing the volume of matter sent by telegraph. Those who have made a study of developing message traffic know that if the service were more positive, more dependable and more accurate much of the matter now forwarded by train, boat and air mail would go by wire and cable.

Telegraph officials long in service and who have dependable memories say that in former times when hand key Morse was used almost exclusively errors were much less frequent than in these days of the "bug" and the printer. It is probable though that the growing employment of complicated codes and ciphers by the business public, with the larger volume of business handled, are contributing factors to the gross increase in word mutilations.

There is a phase of the problem—sometimes characterized under the implied aspersive designation "The present day operator." If it is true that the present day telegrapher is not so careful or accurate in his work as the telegrapher of former days it is more than likely that this is in large part due to differences in methods of education or in the environment of training.

Years ago, country railroad depots were the Alma Maters of a large proportion of the telegraphers who later entered commercial telegraph service. Today, this is not the case in anywhere near the same extent. Telegraphers who learned the art on train order wires were so checked in sending and receiving by train dispatchers that imagination played no part in what was transcribed from sounder to order form or message blank.

Also, in the cities, messenger boys in commercial service who became operators, first worked with main office operators who were not rated rigorously in messages per hour. True, the larger salaries now paid imposes the requirement that the output per operator must, so far as possible, keep pace with cost increases if message tariffs are to remain the same. This situation is an index of the complexities of present day telegraph management.

On the subject of mutilations much has been said. Errors in messages react unfavorably upon the efforts put forth by commercial departments of telegraph companies to increase message volume.

If present day telegraphers are less careful and less accurate in the transmission and reception of messages than they should be we suspect that some of the fault lies in the education, or the lack of it, of the operator and in the methods used to supervise his performance.

A vice-president of one of the telegraph companies recently put into practice some ideas on this subject born of observation at the source—the sending operator's position. A tour was made to a number of offices which handle considerable cable files. In a casual and friendly way individual sending operators were asked the question: "How long does it take you to send a cablegram of ordinary length?" In most instances the answer was: "Oh, about a minute." This gave the vice-president the opportunity he sought; proceeding to instruct each operator: "In future I will expect you to take twice as long to transmit each cablegram as you have taken in the past."

In due time a very material reduction of cable errors occurred with consequent increases in cable patronage. The few extra minutes consumed in carefully transmitting occasional cablegrams, few in comparison with the number of plain language land messages transmitted, was more than offset by the reduced number of service messages calling for repetitions.

It may be said that there is nothing new in this idea. Granted, but there is something new in the application of the idea—direct contact between a vice-president and the fellows who make or mar service.

The official who has thus attacked the source of many message mutilations also has made an analytical study of the mental and physical attitude of the telegrapher toward his work.

Some operators can handle from four hundred to five hundred telegrams during an eight-hour trick and go off duty with few or no signs of having been under strain. Others, at the end of their stint are fagged out and weary.

Aside from the factors of temperament and physical condition known to have a bearing on this condition, it was observed that those operators who showed pep at the end of the day sit in their chairs in natural positions, dispose their feet and legs comfortably, and otherwise relax physically while working, even at top speed; while others perch on the edges of the chairs, wind their feet around chair rungs and twist their bodies into unnatural positions. Much of the tense strain often experienced thus is a result of the lack of example, suggestion and instruction on the part of those who supervise the work of operators.

The telegraph vice-president, whose observations are the subject of this editorial has personally carried on a campaign of education in all offices he visits with a view to correcting these conditions.

This is education which pays—pays the telegrapher and pays the employing company.

ON April 25th, Guglielmo Marconi, inventor of radio telegraphy, was fifty years of age.

Sam Reads Our Ads

Agriculture Teacher—"Sam Jones, what do you know about nitrates?"

Sam Jones—"Why, they are less than day rates, if you're thinking of sending a long distance call."

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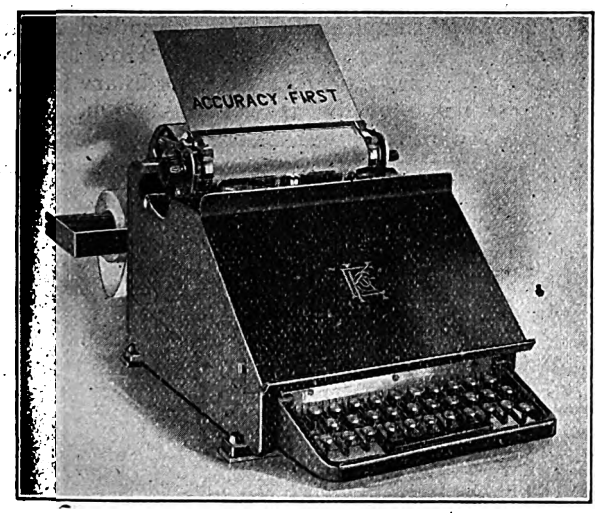
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER



AN ENTIRE SYSTEM
IN
ONE SIMPLE TYPEWRITER UNIT
Not Merely A New Design.
A Revolutionary Change.
The Unit that proves in on lightly loaded circuits.

Kleinschmidt Electric Co.
LONG ISLAND CITY, NEW YORK

HALL SWITCH & SIGNAL CO.
Garwood, N. J. Chicago

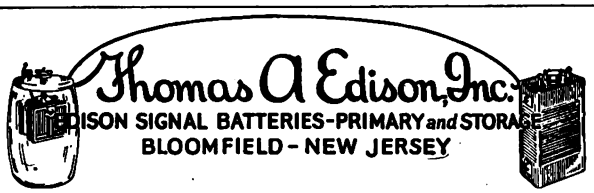
MANUFACTURERS OF THE

GILL SELECTOR

THE UNIVERSAL SELECTOR
FOR
TELEGRAPH AND TELEPHONE

And for the Less Important Stations, too---

Railway Telephone Engineers occasionally tell us that their "more important telephone stations are all equipped with Edison Primary Batteries, but for the unfrequently used way stations, dry cells are still being used."
But—Edison Primary Batteries produce electricity at a less cost per ampere hour than does any other form of primary battery. As a matter of fact their advantage over dry cells is relatively greater in this lighter service, because dry cells have the handicap of a limited "shelf" or "stand-by" life. Full utilization cannot, therefore, be made of their capacity in this service. The capacity of the Edison Primary Battery is normally from ten to twenty times that of a dry cell battery. And—most important of all—it does not matter whether you use up its capacity in three months or three years. You can always count on getting full measure, when-even and however you may want it.
Put Edison Primary Batteries in at those way stations and forget them for a year or so. A hasty inspection of the clever indicator panels used on these cells, tells you positively, at any time, the amount of life that is still available in them.
Let us tell you about the other points of great advantage found in Edison Primary Batteries, which are of even more importance than this matter of proven economy.



ST. LOUIS
Railway Exchange Bldg.

CHICAGO
Peoples Gas Bldg.

SAN FRANCISCO
Balboa Bldg.

2016-36

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

A MEETING of the Committee on Nominations was held at 30 Vesey Street, New York, on May 8, 1924, instead of at Chicago, Ill., May 13.

A meeting of the Special Committee on Circuits was held in the office of Chas. E. Davies, acting general manager, Canadian National Telegraphs, 40 Richmond Street, Toronto, Ont., on May 1st, 2nd and 3rd.

Canadian National Telegrahs

A VERY enjoyable and successful bowling tournament was held on April 23rd on the "Saratoga Alleys" at Winnipeg, between the Canadian National Telegraphs and the Canadian Pacific Railway Telegraphs, in which the National bowlers won 8 out of 9 games played, with 417 points to the good.

The honors for the Canadian National Telegraphs were: high team, 2,641; high single, 222; first high three games (single), 586; second high three games (single), 585.

THE Canadian National Telegraphs has arranged for messenger boys in the large cities to be provided with special courses of instruction, to equip them for higher positions in the service.

Maybin Brown Killed by Train

MAYBIN W. BROWN, for many years on the editorial staff of the Globe, was killed at South Weymouth, Mass., on April 14th, while attempting to board a moving train on his way to Boston. Mr. Brown was trying to catch the 9:39 train and was forced to run as the train had begun to move. But in trying to board one of the platforms, his foot slipped and he fell under the train.

The body was taken to the station where it was viewed by Medical Examiner John C. Fraser. Mr. Brown had lived in Weymouth for a number of years. He is survived by his wife and a daughter.

Maybin Brown was born at Andover on April 29, 1856, the son of well-to-do parents. He was a boy with plenty of initiative, and this quality he carried through a long and eventful life.

He was educated in the public schools of Andover, and went to newspaper work, almost as if by instinct, when he was only fourteen. He worked for the Lawrence Eagle in 1870; in 1877 he joined the Norfolk County Gazette, and in 1879 he was stationed at Narragansett Pier, where he did special work for the New York Sun.

At one time in his youth he learned telegraphy and served as an operator in Panama. Later he set himself up in an electrical contracting business, one of his most famous jobs being the wiring of Keith's Theatre. Not through his fault, the business failed, and in 1885 Mr. Brown joined the Globe staff as reporter for the Hyde Park District, and stayed there until 1893.

There was a five-year interval then, during which he was in business. In 1898 he came back to newspaper work, joining the Globe again as copy reader on the night desk. In December of that year he was made night police reporter, and after a while worked at headquarters for the morning paper.

Then he went to the day copy desk, where he continued as long as he was able to work regularly. At the time of his death he had charge of the column on the editorial page called "What People Talk About," a position that called for an extraordinary knowledge of unrelated topics, and a deal of hard work digging out the answers to the questions of a curious public.

In the meantime, Mr. Brown took up a work as unusual as could be imagined for a working newspaperman. He organized the Cambridge Relief Hospital, an emergency hospital, and was among the first to get industrial concerns to subscribe to such an institution for the sake of having its facilities at the service of employees.

Later still he established an eye and ear hospital on Charles St., almost opposite the Massachusetts Eye and Ear Infirmary. This he later sold.

He established a South Weymouth newspaper and made it successful. He and his wife entered largely into the social life of that town.

Mr. Brown was twice married. He leaves his wife, a brother in Essex County, and a married daughter.

James C. O'Leary is Injured in Crash

JAMES C. O'LEARY, the Boston Globe's baseball writer, was painfully injured a few days ago.

His automobile was struck by a street car at the junction of Eldridge Sts. and Hyde Park Ave., throwing him to the ground. He sustained a fracture of the right collar bone.

The car was being operated by John Dale. Mr. O'Leary was proceeding out of Elderidge St. when the crash came. He got up and despite his injury walked to his home, 316 Hyde Park Ave. unassisted. He was treated by Dr. H. A. Sibley.

The automobile was severly damaged, and one window in the Street car was broken.

T N T Steel Galena

T N T STEEL GALENA and one Desert Cactus Cat Whisker, price fifty cents each. This galena has been produced to make the wireless telegraph and telephone most efficient and that it accomplishes its work is testified to by all users. It is made in California and fills a long felt want. Agents wanted everywhere. Address Telegraph and Telephone Age, 253 Broadway, New York.

"REMCO"
ALTERNATING CURRENT SELECTORS
[Controlling Patents]
Tested and Proved
Manufactured only by the
RAILWAY ELECTRIC MANUFACTURING CO.
135-137 Sycamore St. Milwaukee, Wis.

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Predicts Radio Aid to Sea Cable Work

MAJOR GEN. GEORGE O. SQUIER, retired, former Chief Signal Officer of the United States Army, on April 29th, presented a paper at the meeting of the National Academy of Sciences in which he predicted that the basic engineering principles of radio would soon be applied to ocean cable practice, with atonishing developments.

The General discussed the results of some of the latest experiments in ocean cable apparatus, said that marked progress had already resulted and asserted that there was no real or economic conflict between ocean cable and radio-telegraphy. He predicted that each would eventually be developed along its own peculiar line without undue interference with the other.

"After over a half century of experience with ocean cables, during which time every refinement has been introduced that skill and ingenuity can devise," said General Squier, "we are at present entering a new phase of cable development which will give ultimately a speed and accuracy unthought of at present.

"The basic engineering principles and instrumentalities which have made radio the marvel of the age will be adapted and applied to the sub-audio band of frequencies wherein principally lies ocean cable practice.

"Signal Corps developmental work in connection with the new Seattle-Ketchikan cable, carried out during the last year at the laboratory of William M. Bruce, Jr. at Springfield, Ohio, in accordance with a key plan based upon radio engineering principles applied to ocean cables, has resulted already in marked progress.

"A universal automatic telegraph transmitter, applicable to radio, land lines and submarine cables, has been developed and tested over an artificial cable in the laboratory.

"As in radio, the electron vacuum tube will play a dominating role in this new development. Amplification by several stages of the received cable signals, as in the present radio broadcasting service, will open up an entirely new range of cable efficiency. With properly designated signals, this amplification has been shown already in the laboratory to be practicable.

"There is no real social or economic conflict between ocean cable and radio telegraphy. The one is essentially a point-to-point two-way service between individuals; the other, at present at least, is essentially a broadcasting one-way service, depending upon mass appeal. Each has its own natural field of usefulness in the development of world traffic. The logic of events will eventually place each service in its proper sphere."

Wireless Telegraphy Versus Submarine Cables

THE wave of enthusiasm in BROADCASTING of wireless telephony now passing over England, is causing a lot of extravagant claims to be made as to the ability or capacity of wireless telegraphy to oust cables from the business of electrical communication entirely. The question has again been revived as to whether the cables will be made obsolete by the tremendous strides, made in the art of radio telegraphy and before allowing our enthusiasm to run away with our wisdom, let us consider what has actually been, and is being accomplished in wireless telegraphy.

While not desirous of minimizing in any way, the marvellous development that has taken place in the wireless telegraphy world, we must not lose sight of the fact that considerable development has also taken place in the operation of submarine cables. Wireless has undoubtedly taken a permanent place in the realm of electrical communication and is rendering and will continue to render great service mostly in "broadcasting," ship-to-ship and ship-to-shore communication, but the highest authorities are still unanimous that it will never be the equal of the cables in responding to the exacting demands of the business community for secrecy, speed, and reliability. The virtue of "broadcasting," in itself at once defeats one of the most important functions of telegraphic communication, which is secrecy and this fact was so fully recognized by the British Government during the great war as to cause them to close down the only trans-atlantic circuit then working between Clifden, Ireland and Glace Bay, Canada. A still later instance in this respect has come to light since the inauguration of a wirless service between London and Paris, when it was found that telegrams addressed to Paris and transmitted from London to that City were picked up daily in Amsterdam, Holland.

This lack of secrecy is well known to those behind the scenes in the telegraph and cable business but is a serious realization to business people particularly, when competition is concerned. Another weakness in wireless telegraphy is the very serious interference of atmospheric disturbances, which are so powerful at times as to prevent transmission entirely for many lengthy periods; this was confirmed in a recent issue of "The Fortnightly Review," by no less an authority than Sir Charles Bright.

The statement recently published that the wireless service between London and Paris, had become so efficient that the majority of telegrams between the two cities were being carried by the wireless is to say the least incorrect. As a matter of fact the London-Paris wireless circuit has never had a full days business since its inauguration in January, 1921. In conclusion, it is very significant that new cables are still being made and laid, not only between England and France, but in all parts of the world and the cable companies continue to pay good dividends, even bonus dividends in some cases, but we have yet to learn of any revenue being earned by the wireless people.

—From a Correspondent in London.

OLD age may creep on you, but don't let it jump on you.

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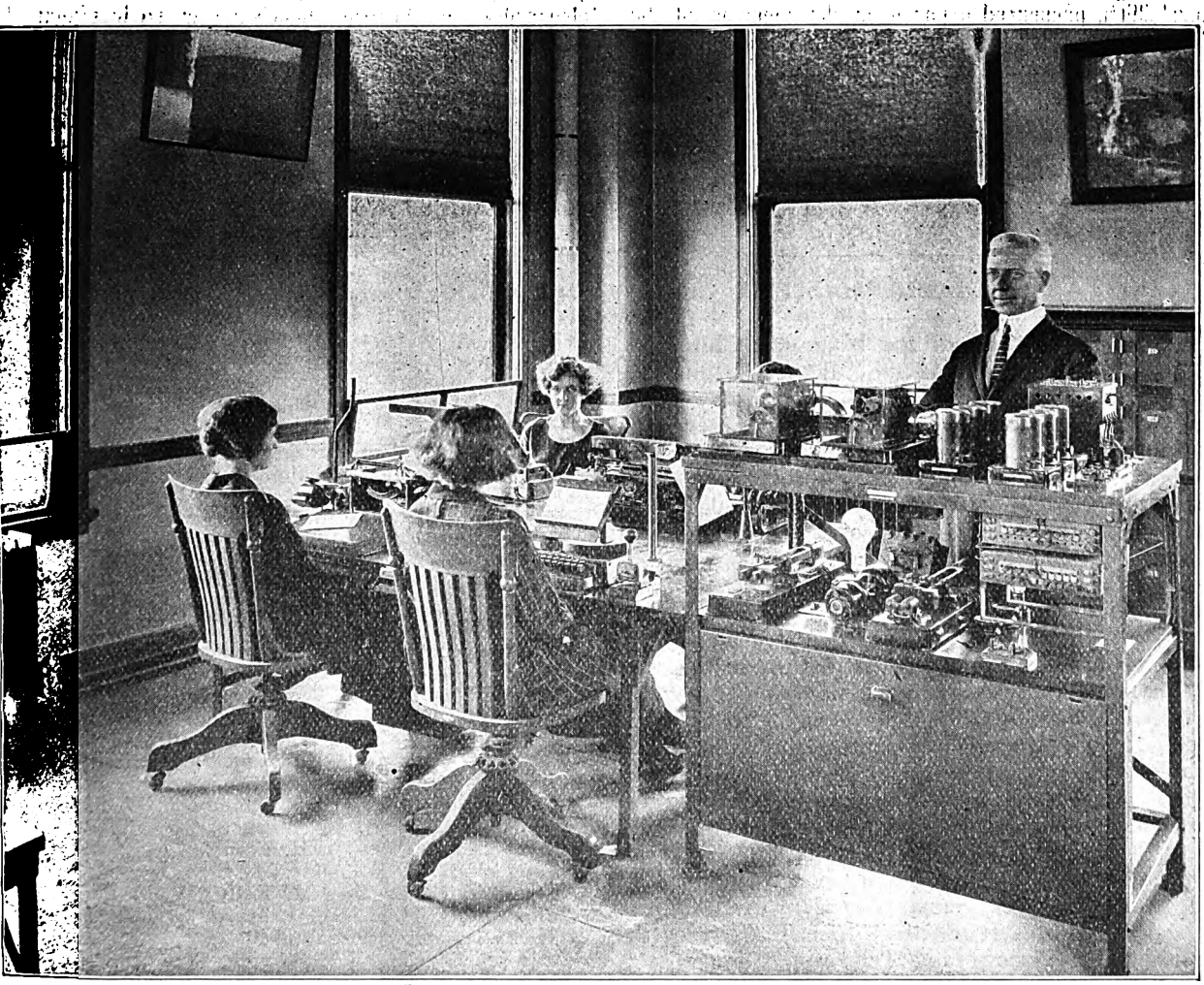
A Corner of a Modern Telegraph Office.



This shows a **MORKRUM MULTIPLEX** in the Omaha office of the **UNION PACIFIC SYSTEM.**

This two channel **MULTIPLEX** operates over a telephone simplex 1,000 miles long, between Omaha and Salt Lake, at a speed of 54 words per minute per channel.

There are two repeaters in this circuit and the **UNION PACIFIC** states that the **MORKRUM MULTIPLEX** handles their heavy traffic satisfactorily with no interference with telephone transmission.

In addition to the Omaha-Salt Lake circuit **(MORKRUM MULTIPLEX)**, the **UNION PACIFIC SYSTEM** has in operation, **MORKRUM DUPLEX** circuits between Omaha-Cheyenne, Omaha-Chicago, Omaha-Denver and Omaha-Kansas City. These printer circuits have been in operation from three to seven years and are still rendering efficient and satisfactory service.

MORKRUM

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PERSONAL

W. J. CAMP, formerly assistant general manager of the Canadian Pacific Railway Company's Telegraphs, Montreal, Que., accompanied by his wife, was in New York last week, the guests of E. P. Griffith of Passaic, N. J. Mr. Camp is now on the retired list and has just returned from Florida where he spent the winter.

MR. AND MRS. EDWIN POPE celebrated their sixtieth wedding anniversary on March 31st. Mr. Pope is superintendent of the Canadian National Telegraphs at Quebec, Que.

POSTAL TELEGRAPH-CABLE CO.

Spring Dinner of the Magnetic Club

THE spring dinner of the Magnetic Club took place at the Hotel Commodore on Saturday Evening, May 10th, about eight hundred prominent telegraph and electrical people being present. Among the invited guests from all over the United States, were the winners of the first and second class banner contest conducted by the Postal Telegraph-Cable Company. The event also fittingly celebrated the fortieth anniversary of the Postal Telegraph-Commercial Cable Company, which was founded by the late John W. Mackay in 1884. Clarence H. Mackay, president of the companies, sat at the head of the table and was surrounded by many outsiders, who were his special guests. Among them were: John Lenord Merrill, president of the All America Cables, General James G. Harbord, president of the Radio Corporation of America; Gerard Swope, president of the International General Electric Company; Frank A. Munsey, Hon. Frank L. Polk, Major General R. L. Bullard, General George O. Squier of the United States Signal Corps, Rear Admiral Charles P. Plunkett, General John J. Carty of the American Telephone and Telegraph Company; J. McMillan, general manager of the Canadian Pacific Railway Company's Telegraphs, Montreal, Que.; J. Gegou, manager in America of the French Cable Company; Lewis L. Clarke, Morton S. Paton, Hon. Julius M. Mayer, Thomas Ewing, Walter Price, Prof. M. I. Pupin, Hon. Morgan J. O'Brien, David Sarnoff, Frank W. Phelan, Elihu Root, Jr., Dr. Charles Needham of the Interstate Commerce Commission.

After coffee had been served, the president of the club and toastmaster of the gathering, Edward Reynolds, introduced President Mackay, who spoke briefly. He then introduced Walter W. Price, who spoke at some length.

Miss Bori and Mr. Gigli, artists of the Metropolitan Opera House, sang several numbers, which were greatly appreciated. Paul Whiteman's Jazz King Orchestra supplied the music.

Those present were:—

Atlanta, Ga.—G. W. Ribble, C. W. Wheeler, S. C. Shelton, H. B. Thornton, Mrs. G. Joyner.

Aurora, Ill.—T. J. Stoeckel.

Atchison, Kansas—C. P. Derryberry.

Albany, N. Y.—L. J. Barreth, C. A. Richardson, Q. J. Andrews, N. C. Pangburn.

Birmingham, Ala.—W. C. Lloyd, Wm. Wenger.

Boston, Mass.—P. J. Macken, J. B. Pansera, D. J. Langlois, Marion Munroe, F. Johnson, W. Ryan, T. G. Cantlett, P. J. Littrell, G. W. Downey, R. H. Gott.

Bethlehem, Pa.—W. E. Petfield.

Buffalo, N. Y.—H. D. Reynolds, M. G. Seibel, A. G. Huggett.

Baltimore, Md.—G. A. Dietrich, W. B. Snyder.

Chicago—S. H. Mudge, J. Nering, W. A. Brady, A. J. Davies, Harold E. Gray, H. S. Waters, J. J. Harrington, J. J. Uhel, W. W. Colosia, Miss E. O'Leary, W. L. Simpson, A. Braza, M. Greben, S. Lesko, Mrs. M. B. Barbour.

Cincinnati, Ohio—S. J. Minning, W. J. Donnellon, L. Hurwitz, W. J. Lynch, M. Bishop.

Canso, N. S.—A. M. Davis, J. Graham.

Corry, Pa.—G. E. Young.

Cheraw, S. C.—Miss E. M. Caulder.

Charlotte, N. C.—W. S. Webb, W. B. Stuart.

Cleveland, Ohio—Miss F. Lumby, A. J. Black, J. Scharnitzky.

Cedar Rapids, Iowa—G. A. Clemens.

Colorado Springs, Colo—Miss N. Caldwell.

Decatur, Ill.—T. A. Quinn.

Des Moines, Iowa—J. L. Wilson.

Dallas, Texas—J. Hargrave, H. J. McPhearson.

Detroit, Mich.—R. A. Haughton, R. M. Armour, Mrs. C. W. Hamill.

Dyer, Ind.—E. C. Brewer.

Denver, Colo.—Mrs. A. E. Willetts, Mrs. B. G. Butler.

Daytona, Fla.—A. C. Chastaine.

Elizabeth, N. J.—W. Kenny.

Fort Worth, Texas—C. Stagner.

Harrisburg, Pa.—C. A. Miller, C. E. Deihl.

Huntington, W. Va.—K. C. Fisher.

Indianapolis, Ind.—J. F. Looney, M. S. Tomcheck.

Jacksonville, Fla.—G. Wertheimer, J. P. Heath.

Jamestown, N. Y.—W. A. Sterner.

Janesville, Wis.—Miss H. McLaughlin.

Kansas City, Mo.—R. Saccamano, Charles Falk, W. T. Richards, Miss H. Pettijohn.

Los Angeles, Calif—H. J. Thompson, U. S. G. Nye.

Lexington, Ky.—C. H. Waggener.

Lakes Charles, La.—A. H. French.

London—H. F. Russell.

Memphis, Tenn.—Miss M. Kelly, W. F. Pope.

Minneapolis, Minn.—W. J. Murphy, Miss M. Sackle, Miss B. Saunders, G. Campbell.

Milwaukee, Wis.—E. R. Lacey, Miss J. E. Meisenheimer.

Meridian, Miss.—H. B. Kelly.

Medford, Ore.—Miss B. Cameron.

New York City—C. F. Leonard, P. A. Hickey, E. Kimmey, J. J. McDermott, J. Sheffrey, E. J. Huber, J. F. McNeill, W. B. Schreiber, Miss E. A. McGregor, W. M. Wolfe, S. F. Austin and wife, Miss M. Ansela, P. Anello, Herman Amster, Samuel Burde, H. C. Buchanan, S. K. Babcock, J. B. Bilsborough, E. A. Berges, L. Bertone, J. J. Baia, T. G. Barker and wife, C. G. Burdeen, W. J. Berden, Frank J. Brown, Sam Cohen, Milton Cohen, Emanuel Cohen, Mrs. C. R. Casellanos, D. A. Creary, Joseph Chiodo, F. Cohen, A. F. Connery, Miss T. Clinton, F. P. Coombs, Henry J. Christ, Harold J. Casserly, Arthur E. Cousins, J. F. Carrington, Wm. Casbay, Mrs. G. M. Condon, Edmond A. Comans, Miss Lucy Cooper, Miss Marion Cooper, Chas. Cuccia, Miss M. A. Coffey, Ralph Carr, Harry Cuddy, M. T. Cummiskey, Louis Cohen, W. J. Deegan, and wife, Thomas M. Drew, George Doxin, J. Dunlop, C. W. Daggett, J. A. Drao, Oscar Darby, Poole Davis, J. A. Dupens, Stanley Dubinski, J. J. Delehanty, Miss F. Drimmer, Thomas J. Durkin, Wm. Dunon, Chas. Di Sylvestro, J. D'Amico, S. E. Ostrom, M. Pertka,

E. F. Lippoth, F. J. Block, T. Lowery, J. McGuire, Wilbur O. Eastlake, J. J. Edwards, James Erlandson, John S. Ellis, David N. Ellis, John W. Eley, G. A. Franks and wife, F. E. Fisher, W. C. Fitts, Joseph J. Foley, L. Sydney Fisher, Wm. Fitzpatrick, James Feltmate, I. Feldman, H. G. Funk, A. Fried, C. J. Flood,

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C. Ferrara, C. P. Flood, David Farb, John F. Fitzgerald, Charles A. Gall, L. W. Gumaer and wife, Francis Garabo, John Goldhammer, M. F. Geigle, H. F. Gearns, John F. Gibbons, A. H. Goodman, J. F. Griffith, D. H. Gage, S. H. Geller, Peter J. Garvey, A. G. Goldberg, F. Horner, J. L. Harkins, H. F. Herbig, Overton Harris, W. S. Hallett, John J. Hans, Jr., Miss L. Hintz, Peter J. Hart, James P. Healy, K. Hunt, J. B. Havice, W. A. Hoffman, Frank Huether, Norman Hoxie, Geo. Harth, R. J. Hall, R. M. Hitchcock, A. C. Johnson, J. Johnston, Thomas V. Jordan, C. L. Johnson, Ralph D. Jones.

L. Keller, John F. Kelly, George H. Kemp, W. L. Kearney, F. J. Kernan, A. P. Kranshaar, A. A. Kramer, Arthur T. Kavanaugh, J. V. Love, James Lauria, Albert Lister, J. F. Lynch, Louis Lichtenthal, John Lapresto, A. M. Levenson, J. J. Logan, S. Legomsky, B. Munson, John Moraghan, R. H. Miller, M. Morgan and wife, J. Micallef, W. C. Michener, C. E. Merritt, John J. Maguire, James A. Mooney, Charles P. Mignon, G. Menza, A. Minori, Miss Minnie Mascola, Thomas Mascola, J. A. Martini, Miss M. F. Moriarity, Thomas A. Murphy, J. J. Murray, Frank Mason, J. H. Murray, W. H. McCaffrey, James McGuire, Thomas McDonald, Daniel J. McCormick, Hamilton McMains, J. F. McArthur, Frank D. MacDonald, R. C. McCue, E. M. McCormick, Miss Jean A. MacConnach, Edward McNally, Miss Ann McAndrews, F. E. McKiernan, A. B. McMillan, James McIntyre, James McLoughlin, M. A. McConnell, R. B. Naugle, George A. Niccolls, J. T. Needham, J. P. O'Donohue, Miss Julia O'Leary, L. O'Toole, G. R. O'Connor.

K. Pearson, F. P. Phillips and wife, F. W. Phelen, F. A. Pirie, J. F. Power, H. Pugliese, Miss J. A. Price, Miss E. Pritchett, Mrs. A. W. Porter, C. W. Pearson, A. E. Powell, A. E. Pezzello, P. Panos, Frank Piscitillo, W. J. Pallas J. Quinlan, D. Quintalino, D. F. Regan, B. H. Reynolds, J. H. Ruddick, Miss Renshaw, F. Rauh, J. Roebling, Edward Rennie, George G. Reithel, Charles A. Reithel, J. J. Reilly, E. J. Rahtes, M. Rattner, J. Richmond, H. H. Russ, Pasquale Renzulli, Edward Reynolds and wife, H. Singer, P. Solaski, W. V. Stahl, T. P. Searles, Miss Sutcliffe, John Sheehan, William Sheehan, E. A. Sullivan, Joseph Sherman, W. D. Shea, Leonard C. Scheld, J. Sullivan, A. M. Smith, W. Storace, J. Setteducato, C. Shirley, Miss B. Shankowitz, N. J. Spinosa, D. J. Suriano, Arthur Smethurst, P. R. Shingler, L. Schwartz and wife, Miss Katherine Smith, Daniel J. Sullivan. Robert J. Tyrrell, E. P. Tully, Joseph Taragon, Edgar D. Thornburgh and wife, R. W. Treut, C. Triolo, R. M. Telschow, John Ulla, J. J. Wallace, W. J. Walsh, Martin Willner, F. C. Werner, Morgan Williams, J. J. Williams, John Williams, R. H. Walls, Mrs. W. G. Wenman, Frank J. Woesseer, Bradley Winslow, A. Wiseman, R. E. Walsh, J. Walsh, John W. Young and wife, Thomas Zoebelein.

A. Adams, G. C. Allen and wife, M. W. Blackmar, and wife, Miss C. D. Benz, H. Baach, T. Brockington, B. Burrell, Chas. Barnett, E. Barnett, H. Sidney Booth, W. P. Brown, M. J. Brooks, J. J. Cardona and wife, C. A. Comstock and wife, H. J. Coghlan, R. Cook, A. H. Clark, A. F. Carraher, W. C. Daviet and wife, F. Donohue, R. Doran, A. Dicorcia, Wm. B. Dunn, Edward Dedon, A. Ellison, J. L. Farrell, Miss L. Fitzpatrick, Miss Emma Fecrhland, A. Flood, K. Fahey, M. Fahey, Wm. Finley, C. Fucci, Wm. J. Geary, J. C. Gefvert, A. I. Gahr, M. R. Greber, J. J. Ghegan, F. B. Gerrard and wife, M. J. Gibbons, J. L. Goffio, A. C. Guiddrida, Chas. H. Heckler and wife, Mrs. E. M. Hayden, J. F. Henry and wife, Thomas Horan, J. Howell, Emil Jensen, P. Keating, Miss E. M. Kernan, L. P. Kearsley, Miss B. Karlack, Joseph Kiernan, F. J. Kerrigan, C. R. Kennedy, R. Knapp, F. Lissner, C. F. Leonard, B. Lynagh, E. J. Leahy, C. P. Linder, Sidney Lasky, Joseph M. Lasky, James Leary, M. Logan, W. J. Lehmer, R. G. Milne, Miss Mary McGinty, J. McGuire, J. Misanda, W. D. Morgan, C. M. Mackey, A. B. Maggio, W. J. McNickle, D. F. Mallen, T. McKeon, C. H. Maurer, Miss M. Mulcare, J. J. McDermott, Wm. J. McCarthy, Jos. Murphy, A. W. McNeill and wife, Wm. J. Mitchell, J. J. McKenna, H. Medollo, N. A. Malpas, A. S. Nigrelli, O. Olson, J. O'Neill, G. J. O'Brien, C. Ormsby, E. C. Platt and wife, Mrs. A. Poinsette, F. J. Prendergast, G. Pellegrino, Joseph Parlo, Mrs. F. Rigney, H. J. Reinhardt, C. M. Riordan, C. R. Rimpo, C. W. Rimpo, James H. Rice, Miss S. L. Rogers, J. A. Rizzo, A. Squicciarini, Mrs. K. Stetson, Miss Peggy Sullivan, J. F. Shugrue, J. Shapiro, J. Shandley, L. Starace, Robert F. Stewart, W. M. Schlaefer, Henry L. Stern, Mrs. J. F. Sheffery, Miss R. Seiken, J. F. Skirrow and wife, J. E. Skirrow, J. W. Tasca, J. B. Taltavall, E. M. Underhill, Florence Van Pelt, H. F. Wyman, R. Winslow, E. Winslow, S. G. Winslow, Miss Rebecca Weisenberg, J. H. Wilson, M. T. Weltman, F. J. Wilbur, H. E. Wilson, F. Yates.

J. Allard, W. Bonke, Mrs. Gladys Beach, Miss Margaret Barros, Edward Bagnell, Miss M. Bersholz, E. A. Coney and wife, P. J. Callahan, S. N. Carpenter, Thomas Clarke, Charles E. Cohn, C. J. Caggiano, Maynard Dodd, Miss Edna Dalton, Vincent F. Fiore, A. S. Franz, Jos. Howard, J. J. Hennian, Miss Gertrude Hogan, F. E. Holroyd, Miss Irene Jameson, R. Kearns, Miss M. Knoll, I. Klutzman, A. Leiderman, Mrs. Ruth Lissner, Mrs. E. F. Lippoth, Robert M. McCready, Miss Katherine McGregor, T. McShara, Miss Florence M. MacLaughlin, Miss M. McCabe, Anthony J. Motto, Geo. T. Mitchell, F. F. Norton, Miss R. Noonan, H. O'Brien, C. W Oram, T. A. O'Keefe, Miss Clara Oxley, E. W. Place, Jr., Miss E. A. Patterson, Mrs. F. Rauh, James Russo, Miss M. C. Riols, W. Reeder, Geo. A. Santull, Mrs. W. B. Schreiber, Thomas Sullivan, Miss Ida Tasca, W. G. Wenman, H. F. Wyman, A. J. Ward, Miss E. Wittgens, James P. Williams, Miss Irene Watkins.

Chas. A. Alvord, Edward P. Amann, J. Burns, Harry Boylan, J. J. Barry, C. F. A. Boulton, J. M. Barry, T. Benincase, Wallace A. Dunne, James DiGianni, Miss G. Daley, Marcel Denis, Miss Lena Ferrante, Frank Ferrante, Jas. J. Finnerty, Howard Graham, Thos. F. Gowdy, Jas. H. Glover, John J. Griffin, W. J. Kavanaugh, Joseph Kane, Walter Kelly, Miss L. M. Loeffler, John F. Larkin, Ernest Malz, James McClusker, John Mehrtens, E. Nielsen, Miss Nina O'Donnell, Esmond P. O'Brien, James C. O'Brien, J. O'Rourke and wife, Chas. Priest, A. B. Parrish, Chris. Prossen, Henry Ringer, Walter Redlefser, J. E. Shea, C. Schmid, Edward F. Seery, Thos. H. Tierney, J. J. Tobin, Michael Tarangelo, W. S. Vail, Vincent Vecchio, Mrs. M. Victeny, E. R. Williams, Robert F. Wittgens, Edwin Witterholt, M. Weiss, Arthur A. Wilson, Chas. Yacht.

New Orleans, La.—J. T. Remley, W. L. Philastre.

Omaha, Nebr.—T. B. Butler.

Orbisonia, Pa.—W. H. Heeps.

Philadelphia, Pa.—C. E. Bagley, J. J. Hardy, F. H. Hoefling, H. E. Owen, F. S. Barrett, G. L. Mumford, C. S. Almes, C. C. Baab, Carl Baab, G. L. Kohlbrenner, F. R. Sauer, E. Schillinger, John Anton.

Pittsburgh, Pa.—H. Scrivens, L. J. Mackay, Geo. Weider, E. Schmeiler.

Portland, Me.—F. W. Anderson.

Plant City, Fla.—I. H. Hayes.

Port Arthur, Texas—C. B. Stephenson.

Pittsfield, Mass.—F. S. Waldorf.

Pontiac, Mich.—G. H. Bertoli.

Paducah, Ky.—Mrs. A. E. Watson.

Rochester, N. Y.—F. Lefebvre.

Reading, Pa.—W. T. Phillips.

Redlands, Calif.—Hugh Mitchell.

Rio de Janeiro, Brazil.—J. T. Sheridan.

Rockport, Mass.—J. W. Lawson.

St. Louis, Mo.—V. E. Blume, James Brown, Mrs. C. A. Waggaman, Miss K. A. Ganey.

San Francisco, Calif.—G. W. Holt, George Horan, H.

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C. Shaw, M. J. Wolinsky, H. I. Huddleston, Mrs. Rose Carroll, L. J. Miller.

Seattle, Wash.—O. T. Schulz.
Streator, Ill.—W. K. Bannon.
Sunnyburn, Pa.—F. V. Green.
St. Albans, Vt.—R. E. McFarlane.
St. Johns, Nfld.—E. Withers.
Stockton, Calif.—M. S. Badger.
San Jose, Calif.—Miss M. C. Harris.
San Pedro, Calif.—M. H. Hilton.
Salt Lake City, Utah—V. E. Cederquist.
Toronto, Ont.—R. J. Needham.
Topeka, Kansas—E. A. L. Stoll.
Vicksburg, Miss.—C. S. Joyner.
Washington, D. C.—I. A. Davis, Miss F. Phelps, Miss N. Benadum, Carl C. Witt.
West Thompson, Conn.—W. P. Flanagan.
Watertown, N. Y.—F. D. Haynes.
Waterbury, Conn.—P. Zachares.
Yakima, Wash.—Albert Stevens.

Mrs. John W. Mackay, Miss Ellin Mackay, Clarence H. Mackay, Frederick H. Betts, Pierre Boucheron, W. Palen Conway, Alfonso de Navarro, Hon. Richard E. Enright, Charles Hayden, Hon John Philip Hill, Charles M. Lincoln, Goodhue Livingston, A. H. S. Post, Herbert Bayard Swope, Norman S. Walker, Louis Wiley, Stephen G. Williams, Edmund L. Baylies, Hon. Jeremiah J. Mahoney Hon. Robert F. Wagner, C. C. Adams, Theodore H. Banks, Edward F. Barrett, Walter H. Bennett, L. Ames Brown. Thomas F. Logan, M. P. Moseley, Kenneth O'Brien, Henry A. Uterhart, Edward Ziegler, Walter H. Bennett, George Claburn, G. Cinqueman, A. E. Pade, James J. Schneider, Wm. H. Draper, Jr., R. F. Munro, Clarence Lister, John S. Schroder, E. L. Totten, Robert G. Lehmann, A. B. Martin, Walter G. Voelker, Leonid Postnikoff, Fred G. Kaye, Augustus Michelini, J. Argow, W. McDonough, Edward J. Sheehy, M. F. Fordham, H. S. Christian, John P. Downey, Herbert Armstrong, Irving Rossi, Martin S. Paton, H. E. Merkel, George F. Mara, Marius Latour, A. E. Alberts, Mrs. H. J. Casserly, Harold Casey, James G. Dorsey, F. H. Dennis, Jr., T. J. Donovan, E. T. Flanagan, Miss Howard, Veto Leo, T. Ormsby, J. J. Privitar, P. J. Rebecca, S. J. Stults, George Wallace, Miss W. Wolk.

A MEETING of the banner winners and other out of town guests invited to the Magnetic Club banquet, was held in the Laurel Room of the Hotel Astor, on the evening of Friday, May 9th. The occasion was a very informal one for the purpose of permitting the guests from various parts of the country to become better acquainted with each other and for a brief business session. The meeting was presided over by Edward Reynolds, vice-president and general manager, who briefly reviewed the reasons underlying the semi-annual gatherings and their advantage both to the Company and to the individual. Then followed the introduction of the guests by Vice-President W. C. Daviet, after which R. M. Hitchcock, of the traffic department, gave a short talk on the handling of printer circuits and units, and superintendent J. Nering of Chicago, on commercial organization. The formal part of the meeting was then brought to a close and an informal social hour followed which proved very enjoyable to all attending.

Most of the western guests gathered at Chicago, the party taking three solid Pullmans over the Pennsylvania Railroad from that point to New York. The railroad extended every courtesy to the party, sending a special representative with them from Chicago to Washington, at which place the cars were parked on Thursday morning and the entire party taken for a tour of the capital in large sightseeing buses, leaving on a late train for New York. Most of the delegates are quartered at the Commodore Hotel.

C. A. Comstock, vice president, has just returned from an extended western trip, visiting quite a number of offices.

Radio Corporation of America

STATIC CLUB

SOME eighty-five members of the Static Club, the "Playground of the RCA," had occasion to "go up in the air," on May 8th, at the Hotel Brevoort, for that was the time and place of its Spring Meeting, designated as "Aircraft Night." It was declared the most successful gathering in the history of the club.

After the serving of a very excellent repast, Pierre H. Boucheron, President of the club, sounded the gavel and opened the proceedings. At the speakers' table, as distinguished guests of the club, were: Monsieur Marius Latour, inventor of the Latour high frequency alternator now used in France for Transoceanic connection; E. C. Cunningham of vacuum tube fame, and Stuart M. Crocker, secretary to Owen D. Young, just returned from Europe.

J. L. Bernard, of "Loop the Loop to Warsaw Fame," was the first speaker of the evening. His subject was, "Flying the Mail With the Aid of Radio." He interestingly told of the United States Airmail service and the part he played as radio operator on the Chicago-Cleveland run. Several hair-raising experiences, one a case in which radio saved the plane and its cargo, were related. A thrilling movie of shots taken from a plane "looping the loop" over Manhattan ,and one in the crater of Vesuvius, were shown. A lantern slide machine was on hand for those dubious of Mr. Bernard's account of his miraculous escape from death, but was not called upon.

George H. Clark, on parole for miscarryingson in Central America, then broke the tranquil atmosphere of the gathering. His was a travesty on Mr. Bernard's talk in particular and the RCA in general. He flew on the scene from Iceland rigged up in Iceland's latest airship, as a representative of the RCI (Radio Corporation of Iceland). His costume was gorgeous, breath-taking uncomprehensible. "Flying the Fe-mail with the Aid of Radio," was the subject of his talk. It was delivered in a masterly manner, and after giving his company a patriotic boost, Mr. Clark told of a few of its discrepancies.

The atmosphere for aircraft night was carefully attended to, miniature airplanes being placed as favors on the tables. Even the menu was printed on an outline of an airplane.

The Static Club meets four times a year, every other meeting being attended by members of the "Clicks," the RCA fairer-sex organization. Its purpose is expressed in the words, "playground of the RCA"—a place where executives and subordinates meet socially on the same grounds.

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WESTERN UNION TELEGRAPH CO.

THE Annual return of the Company, just filed with the Departent of Public Utilities, shows a total of 26,276 shareholders as of December 24, 1923. At close of 1922 the company had 25,819 stockholders.

University of Rochester is the largest holder this year with 5,600 shares, the same amount held over a long period of years. Clark, Dodge & Co., the leader a year ago, reduced holdings from 7,107 to 5,178, thus reverting to second place on the list.

The twenty largest shareholders of Western Union Stock as of December 24, 1923, follow with comparisons:

	1923	1922
Clark, Dodge & Co., New York	5,178	7,107
University of Rochester, Rochester, N. Y.	5,600	5,600
E. F. Hutton & Co., New York	3,648	5,105
Fahnestock & Co., New York	4,627	4,627
Davies, Thomas & Co., N. Y.	3,700	3,700
Aetna Life Ins. Co., Hartford, Ct.	3,500	3,586
Wm. Vincent Astor, New York	3,026	3,026
Lee, Higginson & Co., N. Y.	3,658	2,967
Percy Stewart, New York	2,526	2,626
Cent. Union Trust Co., tr., N. Y.	2,500	2,500
Globe Teleg. & Trust Co., London	2,375	2,375
Benj. D. Phillips, Butler, Pa.	2,200	2,200
Thomas J. Hough, New York	2,158	2,158
Brown Bros. & Co., New York	1,994	2,093
Eliz. R. Vorhees, Clinton, N. J.	....	2,053
Maria W. W. Proctor, Utica	.....	2,049
Helen Hay Whitney, N. Y.	2,040	2,040
C. S. Campbell, Montreal	2,000	2,000
Moses G. Parker, tr., Boston	.....	2,000
T. W. Phillips, Jr., Butler, Pa.	2,000	2,000
Jackson & Curtis, New York	2,016	.....
Brawn M. Bayard, New York	2,323	.....
Phillips & Zoller, New York	2,050	.....

Blank beside a name does not necessarily mean respective holder did not own shares in year so blanked, but indicates merely that amount was not among 20 largest individual holdings of that year.

MR. MACKEY, traffic director at Horta Fayal, Azores, has returned to the Azores via England, having sailed from New York on the steamship Adriatic on May 10th.

Division Inspector W. W. Pulham of the Mountain Division, Denver, Colo., who has been doing some special work in the general offices at New York, has returned to Denver.

C. M. Brentlinger, general inspector, New York was in Champaign, Ill., last week directing the exhibit in an electrical show given by the students of the university.

Messenger Boys Threaten Company's Bankroll at Feast

ONE hundred messenger boys are riding the Streets in Seattle, Wash., who do not intend to eat anything for a week, and the Western Union Telegraph Company is counting a deficit of several hundred dollars in its bank account. All because, when William J. Smith, city superintendent, played host to the boys at Meves Cafeteria a few nights ago he told them, "Eat as much as you like. The sky's the limit."

Astonished guests in the front part of the cafeteria watched a dizzy circle of laughing boys file past the food counters, disappear into the rear banquet room, and then reappear to do it all over again. Strawberries at 20 cents per plate—pooh! They took two helping, and a liberal supply of cream. Cream puffs at 15 cents each.

Tut! Tut! Let the Western Union Telegraph Company spread itself.

"What's your bill, Eddie, huh? Mine's $1.83."

"Mine's $2.20 and I think I'm gonna bust, if I don't catch my second wind or sumpin."

Superintendent Smith watched the devastation with a smile, while he admitted to himself that there was certainly "more in his boys" than he had ever supposed. Musical numbers and a short talk by Sergt. Frank Fuqua of the police traffic squad completed the program.

GAVEON Haggard, employee of this Company, at Goldsboro, N. C., while working on wires in that section recently, received 30,000 volts of electricity in his body. His hands and feet were severely burned, the electricity almost burning his shoes from off his feet. He is reported to be recovering slowly and doing as well as could be expected.

J. T. WARNER, of Los Angeles, Calif., resigned on May 1st to engage in the insurance business. Mr. Warner is well known in many sections of the country and his friends unite in wishing him every success.

A. S. MEYER, one of the Boston, Mass. agents for Telegraph and Telephone Age, was married at North Sydney, N. S. to Miss Hilda Cann, a few days ago. Mr. and Mrs. Meyer have our congratulations.

THE Western Union Telegraph Company transmitted over eleven million messages in 1923.

Old Time Telegraphers' and Historical Association

PRESIDENT F. A. MOHR, announces that the annual Reunion will be held in the City of New Orleans on October 30, 31 and November 1. The weather in New Orleans at that season of the year, is said to be of the most delightful kind—not too warm, not too cold—but just mild enough to be enjoyed by all. The Hotel Roosevelt, formerly Hotel Grunewold, has been chosen as headquarters for the convention.

Telegraph and Telephone Life Insurance Association

ASSESSMENT Nos. 818, 819, 820 and 821, have been levied by the Telegraph and Telephone Life Insurance Association, New York, to meet the claims arising from the deaths of Robert D. E. Rowe, aged seventy-eight years, Newport, Ky.; Tunis T. Dougherty, aged seventy, Paterson, N. J.; Lewis W. Benson, aged sixty-two, Chicago, Ill.; Martin E. Luce, aged eighty-four, Titusville, Pa.; Wm. J. Hamilton, aged seventy-three, Dunellen, N. J.; Richard F. Murphy, aged sixty-seven, Leonia, N. J.; Dr. Jas. O. Green, aged eighty-two, New York, and Rev. Eugene Hill, aged seventy-seven, Passaic, N. J.

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Morse Birthday Observed

THE Eastern Brokerage Division of the Commercial Telegraphers' Union of America commemorated the 133rd anniversary of the birth of Samuel F. B. Morse, inventor of the telegraph, with ceremonies on April 27th at the Morse Monument, at the Fifth Avenue and Seventy-second Street entrance to Central Park.

Bleecker Morse, twelve year old great-great-grandson of Professor Morse, placed a wreath at the foot of the monument, in the presence of his father, Richard W. Morse, and an audience of about 5,000. Park Commissioner Frances D. Gallatin made the address of welcome, after an invocation by the Rev. Mgr. John P. Chidwick. Other speakers were Frederic W. Towne, Chairman of the Morse Day Committee, and Charles A. Towne, former United States Senator from Minnesota. The Police Glee Club and Band also contributed to the program.

Telephone Pioneers of America

THE 1924 ANNUAL MEETING of the TELEPHONE PIONEERS OF AMERICA will be held at CHICAGO, ILL., on FRIDAY and SATURDAY, OCTOBER 10th, and 11th.

The THIRD MEETING of the GENERAL ASSEMBLY wll be held at CHICAGO, ILL., on THURSDAY, OCTOBER 9th at 8:00 P. M.

Full information in connection with the Annual Meeting, Hotel and Railroad Rates, Special Train, etc., will be furnished as soon as possible.

A. L. SALT, President; R. H. STARRETT, Secretary, 195 Broadway, New York.

Recent Radio Tournament

IN the May 1st issue of this publication, on page 298, there appeared an item on the performance of A. E. Gerhard, an operator in the employ of the Radio Corporation of America, who won the first prize in the recent tournament at the Pennsylvania Hotel, New York. There seems to be a question in the minds of our readers whether Mr. Gerhard received hand or automatic transmission and whether the American Morse or the Continental alphabets were used. In this connection, we will say that Mr. Gerhard received automatic sending at the rate of 59½ words a minute, and the Continental alphabet was used. The matter used in this tournament was not the same as that used in previous tournaments; consequently, a comparison of speeds cannot be very well made. It is safe to assume, however, that the Continental alphabet is fully as fast as the American Morse alphabet when an expert sender is at the key.

For Sale

SINCE the death of Thomas J. Dunn on March 31st, 1923, the Dununit transmitting device has not been manufactured. Counselor Jerome J. Dunn, a son of Thomas J. Dunn, is selling out the business and offers for sale the letters patent covering the Dununit and all of the other transmitting devices invented by Mr. Dunn. It will be remembered that T. J. Dunn was the first in the telegraph field to realize the importance of transmitting devices and he associated himself over twenty years ago with the original inventor of the Vibroplex, Horace G. Martin. The patents that are now offered for sale have a life of thirteen years and do not infringe any other transmitting device. For particulars address Dununit, c/o TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

"Wire Woman for Fifty Years

MISS ZEPHREINE E. CARTER, telegrapher for the Boston & Maine railroad at Athol depot, Mass., has just got well embarked on her fifty-first year at the key. She works seven days a week, eight hours a day, and she doesn't see any reason for putting anything in the paper about it either.

Interviewed on the experiences of half a century of dots and dashes, Miss Carter says succinctly, "Well, I've been on the job long. What about it?"

According to her friends and co-workers, however, Miss Carter has seen more railroading than the average railroader. To her quickness of wit is credited the avoidance of several wrecks, and her steady hand at the instrument has helped to untangle many a tragic jam.

With Static Trouble

FOUR-YEAR-OLD Bobby was being taken for a walk on the street and he and his mother passed a gang of Italian workmen jabbering excitedly in their native tongue.

"Oh, mamma," he ejaculated, "it sounds just like the bedtime story on our radio."

The Candler System

Course of High-Speed Telegraphing

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CONTENTS

PAGE

The Application of Radio Engineering Principles to Submarine Telegraph Cables. By Major General George O. Squier..... 244

New "Q" Telegraph Office, New York Central Lines, New York..... 246

Pennsylvania Railroad Operators..... 249

Pioneer Radio Man Says Radio Will Help Form International Boy Scout Order. Broadcasting to America—Is Our Power Sufficient..... 250

Telephoning Telegrams to Nearby Town Most Efficient Method. New York has 40,000 Telephone Operators. Radio Circular Revised..... 251

Finds Radio Waves Slower Than Light. The Abbreviation RQ..... 252

Alaskan Cable Ship to Start First 955 Miles..... 253

An Old Telegram. Old Time Telegraphers' and Historical Association. Chronology of the Telephone Business..... 254

Navigation by Wireless. International Telephone and Telegraph Company.. 255

Editorial Comment—Clarence H. Mackay on the Future. Bulls on Phillips' Code..... 256

The Railroad—Telegraph and Telephone Section of the American Railway Association. Canadian National Telegraphs. Coming Conventions.... 259

Radio Corporation of America. All America Cables. Obituary..... 260

Telegraphers Strike in France..... 262

Postal Telegraph-Cable Company. Commercial Cable Company. Western Union Telegraph Company..... 263

Cleveland Gets Ready for Convention Day..... 265

A Question of Authority. A. E. Gerhard..... 266

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The Application of Radio Engineering Principles to Submarine Telegraph Cables

by

MAJOR GENERAL GEORGE O. SQUIER,
United States Army.

PAPER presented at the Annual Meeting of the National Academy of Sciences, Washington, D. C. April 29.

It is perhaps a far cry from electromagnetic waves of frequencies of a million or more per second, used in space radio, to frequencies of the order of five to ten per second which represent those at present employed in ocean cable practice. In 1910 the writer applied the engineering methods and apparatus of the then existing radio art to the case of metallic wires on land, by employing the hitherto unused band of frequencies extending from about 15,000 to about 100,000 per second, which at that time represented the lowest limit of frequencies used in the radio Art.

It is perhaps not overstating the case to say that the fundamental step taken in those experiments in 1910 has resulted already in revolutionizing the engineering practice of multiplex telephony and telegraphy on wire circuits and wire networks. The new Art of line radio has taken its place definitely as a distinct branch of radio, in the principal countries of the world, and is rapidly extending its scope to include telephony and telegraphy and music superimposed upon long distance high voltage power lines, and to broadcasting service over standards commercial wire networks used in distributing light, heat and power to the public.

The object of this paper is to propose a second fundamental step, analogous to the one taken in 1910, by the application of line radio engineering methods and apparatus to the case of ocean cable circuits.

Although comparisons are odious, it can be scarcely denied that the very recent achievement of long distance broadcasting of music and speech represents a new high level of attainment of the electrical engineering profession as a whole. It behooves us to analyze carefully its vital processes and transformations and apply these intelligently to new fields, such as that of ocean cables and the electrical transmission of power.

The engineer who grasps the fundamental ideas involved in generation, modulation, transmission, amplification, and detection or retification, as illustrated by the broadcasting of speech and music, starts from what may be considered to be, theoretically, the basis of all systems of communication by electromagnetic waves, whether through the ether of space or guided by wires of land lines or submarine cables.

On this view, even the older methods of direct current telegraphy fall in line as special cases of the general case of broadcasting, where the frequency of the carrier wave is reduced to zero and the wave is guided by a wire, the modulator becoming the hand-key or automatic.

Although, as will be described presently, marked developmental progress has been made already, based on this viewpoint, yet it is a specific engineering "attitude of mind" toward the whole problem of ocean cable communication that I wish to emphasize in the present brief paper on this important subject.

General Classification of Circuits for Electrical Communication.

To fix the ideas, we may classify all electrical circuits as:

I. Distortionless circuits—radio or line radio.

II. Circuit with distortion—long land lines, subterranean, and submarine cables.

In Class I circuits, of course, all frequencies are transmitted with equal efficiency and at the velocity of light, with the result that, as far as the medium itself is concerned, the very complex wave representing an orchestra concert or a chorus of voices arrives at the receiving antenna attenuated enormously, but of practically the same shape as the wave radiated from the transmitting antenna.

In the case of long submarine telegraph cables, as now constructed, with resistance, large distributed capacity and negligible leakance and inductance, we have the extreme case of distortion of Class II circuits.

Long land lines, and any combination of these with subterranean cables, fall between these two limiting cases, so that if we fully comprehend the extreme limiting cases, we possess the key to the solution of any case.

In long submarine cable circuits, as now operated, the distortion at high speed, with the exception of a certain group of five letters of the alphabet, is so great that there is little resemblance between the shape of the wave entering the cable and its shape at the receiving end of the cable. The velocity of transmission of the wave through the cable is reduced from the velocity of light to a very few thousand nautical miles a second, and the attenuation is relatively much greater as the frequency is increased.

In Class I circuits, therefore, other things being equal, we are at liberty to use any frequency we please at the transmitter, while in Class II circuits any change of frequency produces a distortion which reaches its limit in ocean cables.

THE KEY PLAN

In cable practice we start with the present automatic cable transmitter which includes a battery source of power, by which the signals are impressed upon the cable. They are transmitted to the distant end of the cable where the signals are first received by a cable magnifier and then pass to the cable relay, and finally to the cable recorder, or direct writer, for interpretation.

To simplify as much as possible only simplex working and a single span of cable need be considered, whereas all important cables are actually operated duplex, and usually several spans of cables must be worked together in a single chain for through traffic.

In the design of the chain of apparatus, we find only what has survived the "acid test" of long years

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of actual practice. The present automatic cable transmitter is a marvel of mechanical skill by which the punched paper tape causes a battery to impress upon the apex of the duplex bridge square-topped waves according to the present cable Morse alphabet, or a modified international Morse alphabet. In the best practice, the speed of this transmitter is accurately controlled by a tuning fork. At the receiving end of the cable, the magnifier and all forms of cable relays still employ the moving coil d'Arsonval galvanometer principle originally introduced by Lord Kelvin.

The engineering note throughout this chain of apparatus is one of the older Art, and it can be said truly that, with the exception of the new Bruce relay employing vacuum tube potential contacts, no new basic principle has been introduced into cable practice for many years. In particular, nearly all advancements made have been directed to improving the receiving conditions only, the type of signals transmitted remaining the same as in the beginning.

Although in the limiting case of Class II circuits represented by an ocean cable, the one thing to avoid in forming the signals is to introduce changes of fundamental frequency, for the reasons discussed yet the present cable Morse alphabet may be described as one actually based on changes in fundamental frequency to distinguish the different letters of the alphabet. This will be apparent from the following:

THE PRESENT CABLE IS A VARIABLE FREQUENCY ALPHABET CHANGING 100 PER CENT.

When two successive pulses of the same polarity are sent into a cable, the current does not return to zero value at the transmitting end and as a consequence there is a piling up effect which tends to displace the recording siphon, for instance, at the receiving end off toward the edge of the tape, and makes it harder to read because there is little distinction in the record between the successive pulses, they being both merged into one large one. The reason for this is clearly brought out when the following fact is considered. If a continuous stream of pulses of the same polarity is sent into the cable in succession, the record shows a wavy line which starts from the center of the receiving tape and oscillates about a medial line which is displaced quickly or at a sharp angle to one side but gradually comes back to the center of the tape. After the record has returned to the center of the tape (the return being due to the presence of a transmitting and receiving condenser in the line) its appearance cannot be distinguished from the record produced by a simple sine wave alternating current. In fact, the same record can be made in two ways, first as above and second by using an alternating current of double the frequency.

The conclusion is that the use of pulses of the same polarity successively is equivalent in record to an alternating current of double the frequency, and that as the first signal to become illegible are those having two successive pulses of the same polarity, the use of characters produced by a succession of pulses of the same polarity is detrimental to speed, and that an alphabet having no successive waves of the same polarity is superior to one having them, in legibility at the receiver. A greater speed of transmission is therefore allowable before the limit is reached.

To illustrate, in the present cable Morse alphabet, the five letters, A, C, K, N and R, are transmitted with one fundamental frequency of alternating current, while the five letters, H, I, M, O and S are transmitted with just double this frequency, corresponding to the first harmonic of the first group; the other letters are transmitted with an equivalent frequency between these limits. The letters E and T indeed are, technically, in a class by themselves, each being formed by a single semi-sinus of current.

It thus appears that in all the years of the operation of ocean cables, the speed of transmission of the entire traffic has been held down by the five letters, H, I, M, O and S, due to the faulty design of the alphabet itself.

Obviously, the ideal alphabet to employ in cable signaling is one in which, other things being equal, each letter has the same limit of legibility at the receiver.

In 1913-15 the writer gave consideration to this subject and designed such a form of cable alphabet.

This form of alphabet would be defined in two ways, as follows:

In present cable language:

An alphabet in which the signals are formed by an unbroken alternating current of a single frequency, the amplitude of whose waves is varied individually to represent dots, dashes and spaces.

In radio language:

An alphabet in which the signals are formed by an imaginary carrier wave of one definite frequency completely modulated by a modulating wave of the same frequency and in phase with the carrier wave.

In the broadcasting model we find a carrier wave of one constant frequency and constant amplitude, modulated by a large number of different waves, representing the different tones of an orchestra or voice chorus, even to the harmonics producing the quality or timbre.

In the alphabet as defined above, this highly complicated process is reduced to its lowest terms beyond which we cannot go. The modulating frequencies have been reduced to one and this one frequency has been reduced also to the same value as the carrier wave itself and in phase with it. On this view, the letters of the alphabet become scientifically simplified speech, which perhaps is a proper definition of what telegraphy was originally intended to be.

Present cable operation may be compared to a patient who has been doctored for many years and now requires a major operation to start him on the road to complete recovery. This operation consists in redesigning the alphabet itself according to the latest engineering practice in the radio art.

Once this fundamental step is taken, it will be shown that improvements and simplifications follow logically in several directions.

(To Be Continued)

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NEW "Q" TELEGRAPH OFFICE, NEW YORK CENTRAL LINES, NEW YORK

Installation of a new up to date Railroad general Telegraph Office

On April 1, the New York Central moved their general telegraph office at New York from the Grand Central Terminal to the New York Central Building, 466 Lexington Avenue, which is situated just North of the Grand Central, between 45th and 46th Streets.

The new office is located in a room 31 feet x 88 feet on the 4th floor. The long dimension faces South on 45th Street and is provided with 8 large windows which afford excellent natural light. The floor, which is concrete, is covered with ¼" battleship linoleum in order to keep down any cement dust which would result from an uncovered floor.

This office, which is designated by the call "Q," is the largest and most recent installation of the New York Central and embodies in the installation the most up to date practice and equipment.

A general description of the plan and then a more detailed description of the different features meriting special attention follows.

General Layout.

Figure 1, shows a photograph of the office from the East end, giving a general view. There are seven operating tables with a growth for one additional table. One table (not shown on the Figure) is ,for telephone message circuits. Two tables, which may be seen in the foreground of Figure 1, are single line concentration unit tables,

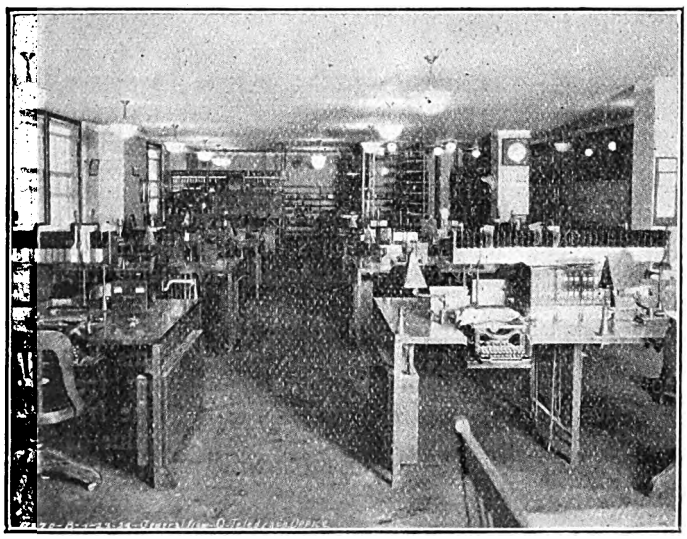

Fig. 1

provided with selectors and lamp signals. Two tables are duplex tables and two tables are combination single and duplex tables. The manager is located approximately in the center of the office, facing the operating force, and adjacent to the railing enclosing the entrance door, from which point he may readily exercise general supervision over the office and be near the door in the event of anyone entering the office and desiring to talk to him.

The power board and distribution panel is of the unit type and accommodates 14 machines. In front of this is the floor distributing frame and then three sections of pin jack switchboard. In front of the switchboard and perpendicular thereto are two repeater tables. The coil and relay rack is in the extreme West end of the room along the wall.

Switchboard

Figure 2, shows the face of the switchboard. Facing the board the sections are numbered from left to right, 1, 2 and 3.

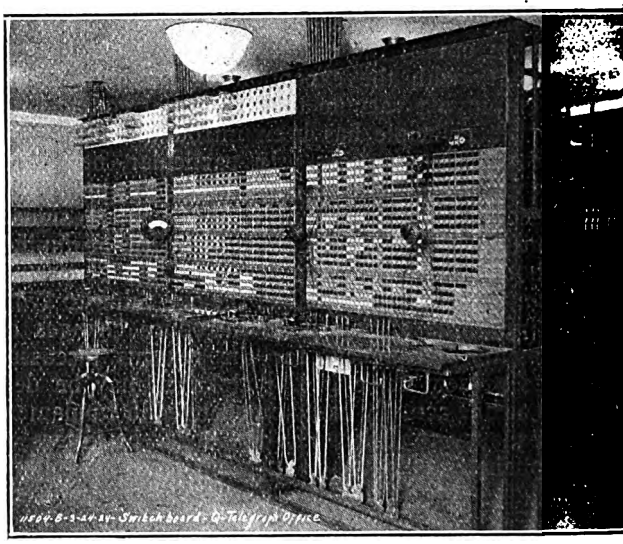

Fig. 2

Section 1 is a combined line and loop telegraph section while Section 2 is a full main line telegraph section. The single line circuits conform to the present New York Central Standard, which are of the cordless type. No doubt many readers will recollect the discussion at the session of the Telegraph and Telephone Section of the American Railway Association at Colorado Springs relative to the merits of the cordless versus the cord board. As may be noted from the photograph, figure 2, the board presents a very neat appearance as compared to the usual type of cord board, which is always more or less cluttered up with cords, that in addition to being untidy, obstruct the view of the jacks and more or less interfere with operation. The cordless board also requires less jacks than the cord board, although this is somewhat compensated for by the extra contacts required on the loop jacks; in addition there is less wear and tear on cords and plugs, resulting in lower maintenance costs.

Section 3 is the telephone section of the switchboard and is the two conductor jack type. It is believed the use of the double conductor jacks is best because of the economy in space and jacks resulting in lower cost and the ease and greater rapidity of operation, as only one cord is required for testing and patching.

Figure 3 shows the rear of the switchboard. Attention is called to the cabling in which the forms are located on top of the jacks adjacent to the panels with the skinners brought out and looped

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back on the jacks. This method, it is believed, is preferable to the more commonly used one of locating the forms in the rear of the jacks and running the skinners forward, since with the method shown

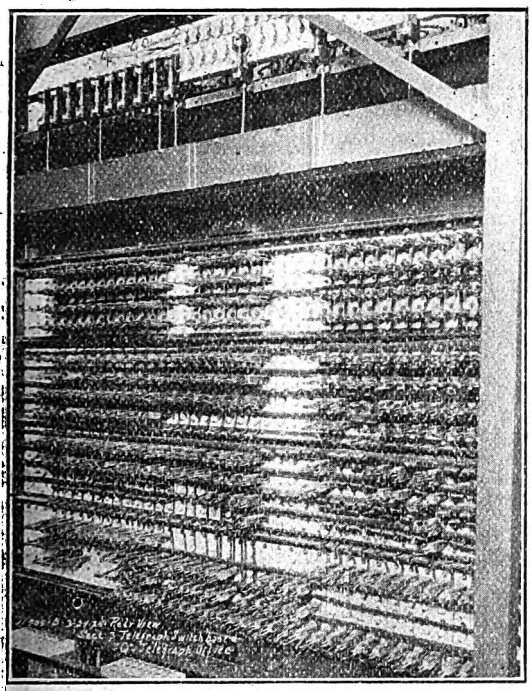

Fig. 3

the terminals are readily accessible for maintenance purposes. With the other method the forms are usually burnt when soldering irons are used to remove the skinners.

REPEATER TABLES.

Two repeater tables with a growth for one additional are located in a position perpendicular to the face of the switchboard so as to permit of ease of operation by the wire chief. They are provided

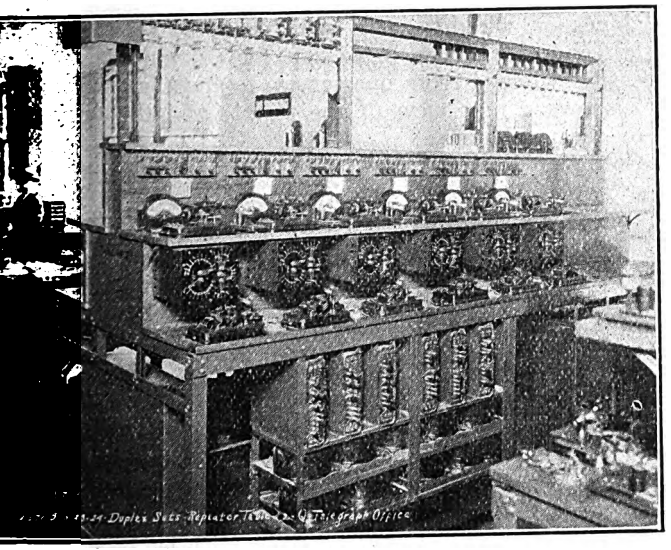

Fig. 4

with one universal duplex repeater, 14 duplexes, 4 front contact shunt locking half repeaters and 24 selector concentration circuits. Figure 4 shows a view of the layout of the duplexes. The artificial line resistance boxes are mounted with the dials facing outward to permit of ready adjustment.

The local resistance units are mounted in an iron terminal cabinet on the table. The pole changer and polar relay are located with their contact faces perpendicular to the front of the table and at the edge so as to afford the greatest ease of adjustment.

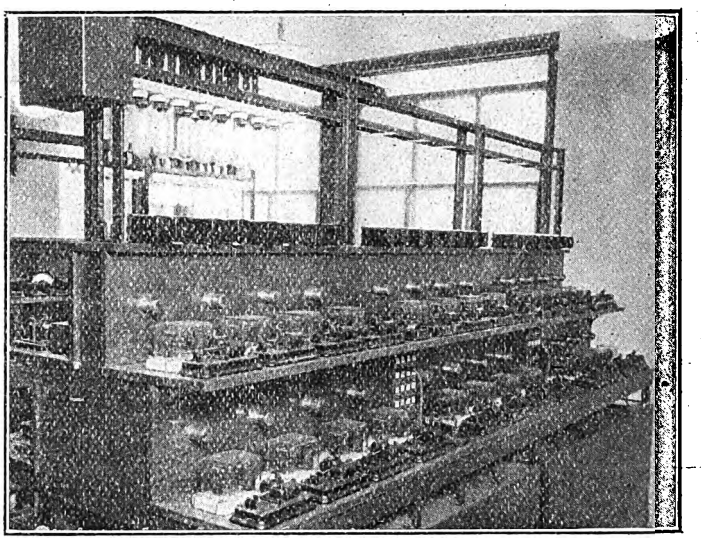

Fig. 5

Figure 5 shows the selector concentration equipment which is mounted on the repeater tables. This was done to allow of supervision by the wire chief and to remove the large amount of equipment from the operating table. The telegraph answerbacks may be noted on the top shelf and the signal locking relays 189-E type mounted against the back of the table just above the selectors. The circuits are wired through jack panels at the repeater tables so that the wire chief can cut in with a master set.

DISTRIBUTING FRAME AND CABLE DISTRIBUTION.

When the new building was being constructed arrangements were made for space for the telegraph office and the floor was not laid. Subsequently when the office installation was started the cable distribution was arranged through a system of floor ducts consisting of 2" iron pipes. These pipes terminated in an iron floor box or trough at the bottom of the distributing frame. This trough 18" wide, 3¾" deep and the full length of the distributing frame is fitted with removable corrugated iron covers. From the trough the pipes run to various junction boxes and distribute to the cables and equipment. These boxes were designed by the Central Office Engineering Department, Western Union Telegraph Company, and prints covering them were very kindly furnished the railroad. The runs to the switchboard, due to the large number of cables, were carried overhead through a hung ceiling.

OPERATING TABLES.

There are a total of 7 operating tables in the office. Two tables are equipped for duplex operation and arranged with switches so that one side of the table may be operated with one position send-

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ing and the other receiving, or by throwing the switch, either position sending and receiving. Two other tables are arranged as described above and in addition may be converted into single line positions by means of an additional switch. These

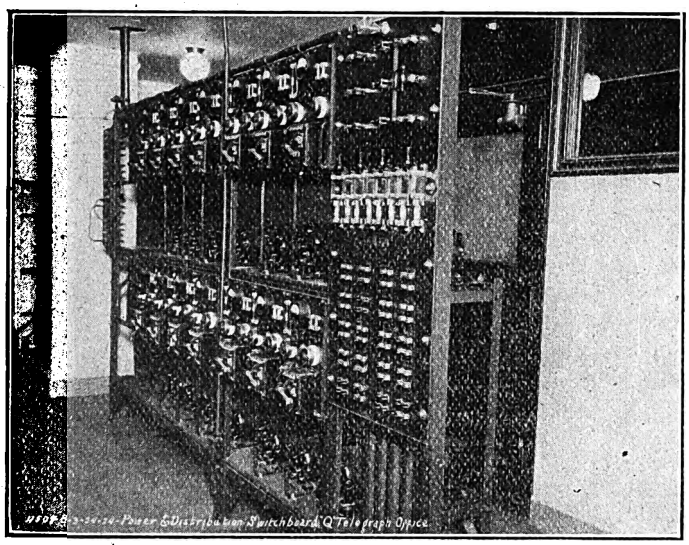

Fig. 6

switches are of the 37-A WU type. Two tables are equipped for single line concentration service with a total of 24 circuits. They are wired so that each circuit is accessible to any operator at the table. When a party calls the office the selector operates and lights a signal lamp in the jack box in front of each of the 8 positions, and a pilot signal on the end of each table. At the same time the answerback notifies the calling party that his call has registered

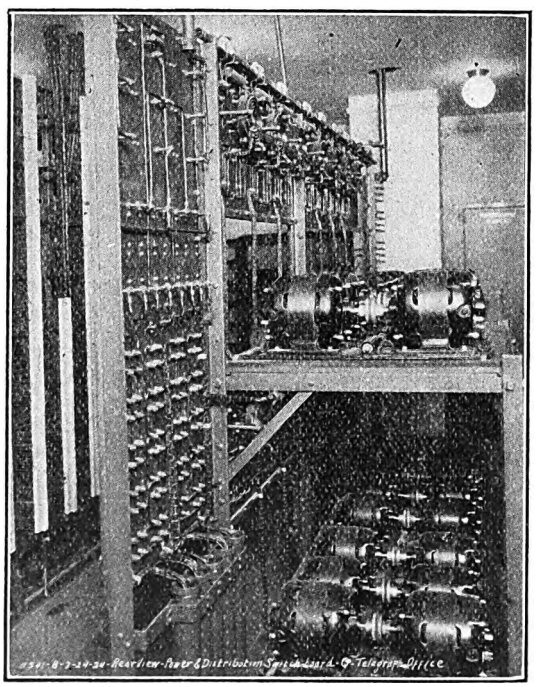

Fig. 7

and he need waste no further time calling. As the circuits are accessible to so many operators it is an unusual occurrence if they are not promptly answered. The looping of all circuits through each position has the additional advantage that at night when but one operator is on duty he need not leave his chair to answer any calls.

The remaining table is used by a telephone message operator handling the Hudson and Electric Division telephone message circuits. As the circuit is equipped with a loud speaker, calling is done by simply saying "Q".

The tables are 7′ long by 4′ 6″ wide and appear to be just about the proper size. In the past smaller tables have been used but they are not as efficient in handling the large railroad report forms. The received messages are placed in the message hook located in front of the typewriter drop. Messages to be sent are placed in the compartments of the message racks located on the tops of the tables. The sent messages are placed in small metal containers immediately adjacent to the received message clip stand.

Motor Generator Bench and Power Distribution Panel.

Figure 6 shows a front view of the unit type motor generator bench. The panel at the extreme right is for incoming main power and local distribution. Current for this office is obtained from the Raiload, 220 volts three wire D.C. system. Should the power fail for any cause, an emergency storage battery for the terminal has been provided which automatically takes over the load.

The local circuits are arranged for metallic working so that in the event that the neutral ground of the power system is lifted the operation of the office will not be affected. The bases of the bench and the panels are made of ¾″ ebony asbestos wood, which seems to be very durable, excellent material for the purpose. The generator sides of all machines are wired to jacks, which may be seen at the left end of the bench, so that the machine may be easily switched from one service to another. Figure 7 shows a rear view of the panel and the wiring of the machines.

Coil and Relay Rack.

The coil and relay rack is located at the West end of the room as shown in the layout. There is mounted here not only the usual phantom and composite coils, but also the ringing equipment for the dispatchers and message circuits and composite ringers, the relays being mounted in a relay rack adjacent to the end of the coil rack.

"Q" office is essentially a large railroad terminal office, although some circuits are often repeatered. There are a total of 58 telegraph and telephone circuits terminating in the office as follows:

Six long distance telephone circuits; 3 message telephone circuits; 7 dispatching telephone circuits and 42 telegraph circuits.

These circuits radiate in a Northerly direction out of "Q" office along the Main Line, West Shore and Harlem Divisions, reaching all of the principal

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points on the 13,000 miles of road in the New York Central System; from Boston and Montreal to Chicago and St. Louis. Over these wires there are handled in this office an average of 126,000 telegraphic messages per month; this count being on the basis of the American Railway Association recommendations: one number per message or report regardless of its length.

The operating force consists of a manager, three wire chiefs, eighteen operators and four messengers. The telegraph and telephone censor, who covers the entire sytem, also has his headquarters in "Q" office. There is cut in on his desk the various telephone circuits which he can monitor directly. He has access to the telegrams for such checking over as is desired.

When it was finally arranged to move to the new quarters, the method of handling the work was given careful consideration and it was decided to draft complete detailed engineering plans and specifications, outlining exactly how the work was to be done. While they required a certain amount of time in preparation it subsequently proved to be well spent. The work proceeded very smoothly in accordance with the carefully thought out plans; avoiding the necessity for snap judgment or the working out of details on the job, proceeding to completion on practically schedule time.

The plans and specifications were prepared by J. L. Niesse, telegraph and telephone engineer, New York Central Lines, under the general direction of E. C. Keenan, general superintendent telegraph and telephone, New York Central Lines.

Pennsylvania Railroad Operators

EDITOR:—

I was greatly interested in seeing the roster in your May 1st issue, furnished by J. M. Alter. It recalled to my memory, many former Pennsylvania Railroad chiefs and operators.—

In 1884, I secured in an autograph album, the signature of the operators in the main offices of the Pennsylvania Railroad, and will give you my record to be used if you think it would be interesting:

PHILADELPHIA, 1884:

Division Operator, H. Fondersmith, D. C. Sayers, Chas. A. Howard, C. E. Gore, R. A. Stoll, H. D. Reese, B. H. Loveless, R. G. W. Denison, W. H. Zehindig, O. M. R. Magill, Willis C. Marshall, Clifford W. Shinn, O. J. Derousse, Lizzie A. Hart, Mary A. Bull, Annie Gregory, F. F. Dunlap, E. Elmer Thompson, S. W. Graham, J. A. Young, Geo. R. Lanahan, J. B. Barkdoll, G. C. Jefferis, John A. Thompson, H. C. Hershey, M. F. Haughey, S. C. Crouse, Chas. E. Murphy, W. McKinsey, W. J. Gallagher, Jas. A. Dwyer, J. E. Wright, W. J. Ramsey, R. M. Fish, Sadie P. Hemphill, F. W. Nutt, C. Stanley Hurlbut, G. F. Irwin, J. H. McFadden, Chas. E. Wineland, F. H. Lytle, H. Logan, Jno. O. Roonlach, C. Rogers, W. D. Read, Chester Clark, R. J. Park, James Foote, Theo. Reitmeyer, Wm. E. Tribit, E. E. Beck, Jos. L. Osmond, James H. O'Donnell, E. B. Walton, Ella Callaway, Jos. J. Reilly, K. H. Holt, Chas. F. Bloomer, Amos G. Manahan, W. B. Gormley, Chas. Z. Denney, M. J. Wilson, F. B. Shertz, J. E. McCann.

HARRISBURG, 1884

Division Operator, A. R. Keifer, S. E. Miller, W. H. Balsley, Chas. W. McClintock, E. W. Madden, Wm. C. Corbitt, H. J. Rose, W. H. Jones, Elizabeth Cogley, Albert Mayer, Chas. A. Crowl, W. H. Black, M. T. Walker, Clem B. Johnson, Ed. F. Miller, J.B. Church, R. A. Richardson, S. F. Shatts, Geo. B. Hapton, Scott S. Crane, J. N. Whiteman, J. E. Atkinson, Mike J. Moore, R. B. Gemmel, who was later superintenden of telegraph of the Atchison, Topeka, and Santa Fe, added his name under Harrisburg and shows he was there in 1857.

HARRISBURG, 1910:

Division Operator G. W. Remine, D. W. Hawthorn, H. E. Toomey, W. J. Hayes, E. H. Gottschall, Chas. Gingrich, E. G. Smith, A. V. Baumbach, H. C. Hershey, Jos. Brown, W. S. Hess, Jas. Evans, J. M. Dissinger, J. K. Howe, Jno. J. Ryan, H. C. Baum, F. B. Spink, J. E. Roth, S. L. Meloy, J. W. Hugle, Geo. A. Ritter, H. E. Hayes, J. G. McLaughlin, Jos. L. Carroll, U. G. Nagle, W. J. Price, W. B. Orendorf.

ALTOONA, PA. 1884:

Division Operator, W. F. Taylor, Ed. R. Kelly, Chas. N. Sawyer, W. J. Lowe, S. A. Hamilton, C. B. Moran, C. E. Postlethwaite, J. E. Leaman, J. W. Trimmer, Miss E. A. Slack, W. Jeff Dean, W. F. Dougherty, W. H. Herr, J. E. Riley, Walter Y. Rich, J. B. Maran, J. C. Gettys, E. H. Cover, Thos. L. Rich, W. P. Lightner, H. S. Turner, W. Scott Miller.

ALTOONA, PA. 1910:

William F. Taylor, Joseph W. Smith, Harry R. High, Thos. E. Bruner, H. L. Spottswood, Geo. F. Beaver, J. B. Moran, W. W. Stouder, A. N. Gripple, S. E. Miller, Gilmore Miller, J. A. Lear, D. E. Banks, G. W. Havens, A. L. Harvey, C. B. Seattle, S. A. Duff, W. D. Swank, H. W. Morgan, C. H. Williams, Harry W. Swope, Warren L. Hesser, Jos. S. Leader, Wm. H. Kauffman, J. S. Nolte, Fred. W. Mickey, C. W. Meloy, Woods Hesser, W. L. Brancher, E. P. Faines, G. F. Quinn, O. A. Sanders, J. W. Trimmer, Harvey A. Lyttle, Amos. H. Newcomer, E. L. Schoonover, E. E. High, Frank R. Patterson, Thad. Metzler, S. F. Shatto, C. G. Troxell, R. Ulysses Cline, Thos. L. Banks, Bruce Carpenter, D. S. Bratton, H. M. Cameron, C. W. Garland, John C. Morning.

PITTSBURGH, PA. 1884:

Chief Operator, John Suter, J. H. Hannett, E. H. Byers, J. F. Amend, J. J. Murphy, D. E. Shook, Emma T. Gordon, Ada J. Donald, D. C. Stewart, James Hamilton, Amanda Byers, Maggie Drynan, Ada McMinn, H. McCormick, J. W. Yealy.

PITTSBURGH, PA. 1900:

Division Operator, S. B. Murphy, Wm. Allenbaugh, W. S. Peters, John Kiger, D. W. Bickel, F. E. Simpkins, L. A. Miller, S. R. B. Stewart, A. L. Rice, H. B. Kline, J. M. Crawford, C. C. Conley, J. H. Cowan, E. K. Brandt, J. G. Dennis, H. E. Mergenthaler, E. B. Stoll, E. G. Troy, R. P. Robinson, H. A. Kacy, J. E. Foster, J. O. Johnson, J. S. Hess, E. R. Bowers, J. O. Briggs, W. C. Murphy, J. C. Cummings, E. C. Hammond, J. C. Witt, H. Weitz, James Hamilton, Geo. H. Whittaker, Jane L. Collins, Oscar P. Keppel, Jack M. Morris, H. G. Ehrenfeld, F. J. Martin, Phillip S. Pyle, E. C. Luther, H. C. Fedderson, J. V. Baldwin, N. S. Nenaugh.

NEW YORK & JERSEY CITY, 1884:

Chas. F. Dilks, Nettie B. Gamble, Rosa A. Hilligan, S. A. Campbell, W. H. Tolson, Mamie S. Halligan, W. H. Sherrerd, C. V. Patterson, K. H. Briggs, F. L. Potter.

Very respectfully, R. S. STATLER, 1100 Railway Exchange Building, Chicago, Ills.

First Radio Bug—"Do you know who was the first radio amateur?"

Second Radio Bug—"I'll bite—who?"

First Radio Bug—"Adam, because he took his spare parts and made a loud speaker."

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Pioneer Radio Man Says Radio Will Help Form International Boy Scout Order

SPEAKING before one of the largest Boy Scout audiences gathered together in a New York Auditorium, Pierre Boucheron, one of the first radio amateurs in the United States, whose entry into the ranks of the experimenter dates back to 1906, and now with the Radio Corporation of America, predicted that radio broadcasting would lead the way to the formation of an international Boy Scout organization in which the scattered groups of young men in the principal cities of the world would enjoy relationships far more intimate than any other agency has thus far been able to provide. Mr. Boucheron also pointed out that the limited number of available wavelengths in the ether required the strict observance of laws governing radio and asked Boy Scouts of America to pledge their support to the work of the Department of Commerce in enforcing these laws. The affair was a "radio party" arranged by the Boy Scout Foundation of Greater New York for the 23,000 Scouts under its jurisdiction.

"The call to rally has long been sounded my means of the Boy Scout Whistle," said Mr. Boucheron. "Its shrill blast has echoed throughout hundreds of camps, and hiking parties have been guided by its note. Yet its feeble signal scarcely reaches the extremities of camp. Reinforced by the tremendous amplifying ability of a powerful broadcasting station, however, and the same signal will call a nation of listening scouts to attention. Thus, through the agency of radio scouts in cities, villages, and hamlets are welded together into a single group, and 500,000 scouts may hear simultaneously the voice of their leader and Honorary President, the President of the United States."

"I believe radio broadcasting will accomplish even more than this. Already programs broadcast from the United States reach out to foreign lands. Reliable international broadcasting should result from various lands. Reliable international broadcasting should result from various refinements in transmission and reception coupled with increased power. When Baden Powell, speaking from a London broadcasting station, is plainly heard in all parts of America, and Dan Beard, one of America's scouts, returns a salute from the United States, radio will prove a still more powerful vehicle for promoting the Boy Scout movement."

Counting upon some of the technical problems of radio, Mr. Boucreron said: "There is only one ether, one vast highway in the skies, which must support the burden of every conceivable message hurled through space, whether it be a broadcast concert or a radio telegraphic wave. We must use this ether with the utmost respect for the rights of others. This great common highway is divided into "lanes," which are policed by the radio inspectors of the Department of Commerce in the same manner as our automobile and pedestrian traffic on the streets. With the rapid growth in the number of broadcasting stations in the United States, this broad highway had to be divided into many narrow wavelength bands to make a place for all until today few additional divisions are possible. If through selfishness, lack of care or ignorance, amateur operators, violate the regulations governing the use of these wavelength roads, the foundations upon which the entire radio structure rests, will collapse. Each listener, amateur and commercial operator has a definite responsibility which he must assume in order to preserve radio's usefulness. I believe the Boy Scouts of America, an organization of 500,000 law-respecting young men, who daily demonstrate their regard for the rights of others and whose loyal devotion to the highest principles of citizenship have won for them the praise of the nation, have an important duty to perform in this radio scheme. They should impress upon others the importance of observing strictly radio laws in general; they should instruct those who, through lack of knowledge, make trouble for their neighbors by sending amateur messages during the hours set aside for broadcasting and report cases of violation to their local radio inspector; their advice guided by that of their Scout Masters should even extend into the home of the radio novice, who may not be entirely familiar with the operation of a receiver. The Boy Scouts, through organized radio troops, may thus create another field for their endeavors, which should prove extremely helpful in maintaining a well-organized radio system in America."

Broadcasting to America—Is Our Power Sufficient

IN the recent attempt to broadcast from the Savoy Hotel in London to the United States, it has been proved that although thousands of enthusiasts all over that vast country were listening in on the most UP-TO-DATE receiving sets, scarcely half a dozen have been able to satisfy the authorities concerned that they actually received 2IO's signals. In fact it has been conclusively proved that the tests were unsuccessful in New York City and the surrounding district.

The question is being fiercely debated as to whether it is possible to receive the English signals on the various sets as used at present. Many people in New York wonder why they are able to receive stations on the West coast of the United States, San Francisco for instance, and yet cannot get Great Britain.

Before discussing the merits of the ether, what are the distances? San Francisco, the furthest station West, is approximately 2,500 miles from New York while to the East, London, England, is roughly 3,500 miles, or approximately 1,000 miles further than San Francisco. The latter city is situated at the end of a land route, while the former is at the end of a sea route and yet it is generally understood that wireless waves travel much better over water than over land. The geological formation of the earth is an important factor in the transmission of radio signals, but the actual controlling factor is of course, the ether itself. One of the great-

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est troubles in radio broadcasting is dead spots, which exist over water as well as land and are continually in motion. In addition to this difficulty, electrical strata exist on the horizon, which also has a detrimental effect upon wireless signals and which to a large extent prevent the reception of the English signals until London increases its transmitting power sufficiently to break down this barrier.

In an expert's opinion no receiver is sufficiently sensitive to receive the English signals, because the waves when they reach the American side have not sufficient energy to operate the detector. If multistage radio frequency amplification is used the signal is so weak as to be lost in the transferring stages. The deduction being, that the amplitude of the wave is so small that the losses in the set are greater than the received signal. It is impossible to amplify and detect something that has so small a value. If any success is to come to the English stations in broadcasting to America, this expert declares that it will be absolutely necessary for London to use much higher power than at present.

Of course, there have been cases where London's signals have been received, but only with freak conditions. No doubt, the air was entirely free from American broadcasters and it was after midnight in London, with exceptional weather conditions in the Atlantic.

During the recent test, even if London's signals had been reaching New York with sufficient energy to operate receiving sets, it would have been impossible to hear them because of the comparatively strong signals from American stations, which transmit on wavelengths too close to those of the British station. In future experiments it is imperative that all American stations should be shut down, or if this cannot be agreed to, then change the wave length of the British station. At the same time experts agree, that if the London station would increase power so as to break down any dead spot and electrical barriers, there is no reason why, with a good selective set, American listeners should not be able to pick up the signals from their English cousins.

Telephoning Telegrams to Nearby Town Most Efficient Method

THE practice of delivering telegraph messages in a nearby town by telephone is held by the Ohio Public Utilities Commission to be a more efficient method than to establish a branch telegraph office therein.

On complaint filed by certain residents of Norwood, the commission cited the Western Union Telegraph Company and the Postal Telegraph-Cable Company to appear and show cause, if any there be, why an order should not be issued directing and requiring each of them to establish and maintain an agency in the city of Norwood for the receipt and dispatch of telegraphic messages.

The commission found that the telegraph companies were at present rendering service to the users of telegraphic service in the city of Norwood from their main offices in Cincinnati direct to patrons by telephone, supplementing its service to those who have no telephones by means of an agent stationed at a pharmacy in Norwood from which messages were delivered to those having no telephones and from whence messages could be sent by those without telephone service or by those who desired to go to this point to dispatch their messages. The only feasible method of operating a telegraphic service in the City of Norwood other than that now in existence the commission found would be to establish in that City a branch office or offices connected with the company's main offices in Cincinnati.

After considering all the factors and evidence in this case the commission held, in its order dated March 20:

1. That the present arrangements provided the citizens of Norwood with a better, quicker and more efficient telegraphic service than would be given were branch telegraph offices established in the city.

2. That it would not be feasible or reasonable to require the telegraph companies to establish an office or offices in Norwood having direct connections with the larger Cities throughout the country under present conditions of telegraphic service at this point, and that this proceeding should be dismissed.

New York Has 40,000 Telephone Operators

ABOUT 20,000 telephone operators are employed in the 134 telephone exchanges of the New York Telephone Company and in the Long Lines Department of the American Telephone and Telegraph Company in New York City. To these should be added some 20,000 or more additional telephone operators employed by private concerns, making a total of over 40,000 operators engaged in the task of serving the people in this one city—which number is about half the population of the entire state of Nevada.

Radio Circular Revised

A second edition of Bureau of Standards Circular 74 on Radio Instruments and Measurements has been issued. This circular presents information regarding the more important instruments and measurements actually used in radio work and is planned to be of use to Government officers, radio engineers, etc. It makes no attempt to deal with the operation of apparatus in sending and receiving.

The first edition of this circular was issued on March 23, 1918. The new edition contains a number of corrections and revisions. Many of the matters dealt with are or have been under investigation in the laboratories of the Bureau of Standards, and are not treated in previously existing publications. The bibliography of radio publications has been considerably extended.

Copies of the new edition of Circular 74 may be obtained from Telegraph and Telephone Age, 253 Broadway, New York, at 75 cents per copy.

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Finds Radio Wave Slower Than Light

THE discovery that the radio wave travels slower than light was announced on May 11th by Captain J. J. See, Professor of Mathematics in the United States Navy, Government astronomer at the Mare Island Navy Yard and well-known authority on the theory of ether.

According to Captain See, the radio wave travels around the globe with a velocity of 165,000 miles a second, while light travels 186,000 miles a second. Captain See considers that his discovery of the velocity of the propagation of the radio wave about the earth may prove the most notable step in the development of the wave theory since Roemer's original discovery of light in 1675.

In an outline of his discovery, Captain See said since the wave is propagated in the ether it is remarkable that there should be the long recognized velocity, for light in free space, and a smaller velocity for the radio wave as it bends around the globe.

In the year 1914 there was an official interchange of signals between the naval observatory at Washington, and the national observatory at Paris. The mean velocity of the wireless wave was found to be about 173,000 miles per second.

Early in March of the present year, a wireless signal was sent from the sending station near New York to Warsaw, Poland, and reflected back in 0.054 of a second of time. The double distance is 8,500 miles and the speed of the transmission comes out about 158,000 miles per second, or about 15 per cent. less than the velocity of light.

"The mean of the the two independent determinations of the wireless wave is 165,500 miles per second less than the velocity of light. This is eleven per cent. slower than light travels in free space. So great a falling off in speed, in two well devised experiments, separated in time by ten years, could hardly be the result of chance, and thus we are led to recognize the fact that radio wave certainly travels over 10 per cent. slower than light, in distance such as those separating Europe from America.

"What is the cause of this slower velocity of the wireless wave? It is simply this: The aetheron or particle of aether is only one-four-thousandth part as large in diameter as the hydrogen molecule—so that compared to ordinary molecules of the size of oranges the aetherons would be like smoke from a cigar, and moving with a velocity of 294,000 miles per second. The wave travels through the solid earth as well as through the air and free space above the air, but is much resisted in the solid globe. As the aether is 689,321,600,000 times more elastic than air in proportion to its density—thus almost infinitely elastic—the medium cannot suffer a break in its continunity, yet the movement above the earth is held back by the slower movement of the wave in the earth. The resistance in the globe thus acts as a drag on the wave at its base. The result is that the wave bends around earth.

"This bending of the wave front in the aether, due to retardation at the base of it in the earth, is quite analogous to the change of form of water waves as they run ashore to form breakers. The advance of the water is resisted at the base, while that of the crest is unimpeded, the top of the wave thus gains upon the base and its form changes.

"Recently a concert going on at Chicago was distinctly heard near Cleveland, Ohio, by observers at a depth of over five hundred feet in the solid earth. In Idaho and Montana radio waves have been received in mines at the depth of about half a mile. This is direct experimental proof that the wave travels through the solid globe itself, and therefore must move more slowly in this dense mass, the wave front thereby being made to bend around the earth, when it advances to great distance, as from New York to Warsaw.

"The view, now strikingly confirmed by observations of velocity in wireless telegraphy, showing definitely that it penetrates deep into the globe and thus retards the wave front in the earth with resulting bending of the wave about the globe, gives a valid foundation for some of the most striking phenomena in physical science. The results are a connection with the wave theory of magnetism and the cause of universal gravitation, because they bear on the cause of the fluctuations of the moon's mean motion."

The Abbreviation Rq

TELEGRAPH AND TELEPHONE AGE,
New York City.

Dear Sirs:—

Reading the article in the "Age" of May 1st referring to the origin of "OK", etc. makes me think of asking if it would be interesting to you to know where "Cq", etc. came from.

My understanding is that the "q" at the end of so many authorized telegraph cable abbreviations began with "request," which word "request" became "rq" = query, and thence came "bq" meaning a reply, "cq" = "all stations," "dq" signal between address and text of message, "mq" = "wait" "kq" = "reply when ready," and "uq" = "other cable" or "other line," such as "answer "uq;" which would mean "answer on other wire."

The "30" used at end of messages, to which article in question referred is used by the radio, and is practically equivalent to the "sn" signal used for 60 or more years by submarine cables, which "sn" is called "understand" signal and is merely an abbreviation of that word to two letters. The radio adds a letter "t" to it, and thus it sounds like an American Morse figure "3" with a nought added, making it your "30" which as your article states has been used in this country so long to denote "finis." I do not attempt to draw a parallel between this "snt" signal on radio and the "30" signal, but it is interesting to see how closely they resemble one another except for difference in code, American and Continental

Yours very truly, L. J. WILLIAMS, *Orleans, Mass.*

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Alaskan Cable Ship to Start First 955 Miles

THE laying of the first 955 miles of the new Alaskan deep-sea cable began on May 8th, when the army signal corps cable ship Dellwood left Seattle for Ketchikan.

The Dellwood arrived in Seattle April 30, from London, where the cable was purchased, and she will return for another similar load and lay another lap of the wire when she has finished the first one.

Lap by lap three cable lengths will be laid along the coast of Alaska to Seward, where the present Alaskan cable, laid twenty years ago and now badly cut up, ends. From Seward the Dellwood, making trips back to London when she has exhausted each 955 miles—for that is all her draft will safely permit her to carry—will push the great steel line of communications farther and farther to the north and west, out past the Aleutian islands, until some time in the future the dream of a century may be realized—an All-American deep-sea transpacific cable.

When that time comes, say international experts, this nation will no longer look with concern upon the little islands of Guam and Yap, surrounded by Japanese mandate territory, where the ends of the present American Commercial-Pacific cable lines lie at the mercy of any possible enemy.

The cable was loaded into tanks of salt water at the works of Siemens Brothers & Company, Woolwich, England, where it was purchased and brought, in the Dellwood, through the Panama canal, to Seattle. The temperature of the cable in the salt water tanks had to be kept the same at all times and had to be equal to the temperature of the Alaskan waters, so considerable difficulty in shading and cooling the tanks was encountered in the tropical regions near the Panama canal.

The cable is the largest and best in the world, steel armored, with gutta percha core, in which the communication wires are embedded and protected at shore ends by extra armor. It was loaded into the tanks in the reverse order in which it is to be laid to Alaska. The ship when laying the cable backs with it, the windlass releasing the big wire from the bow of the vessel. Gutta percha, deep-sea cable is not manufactured in the United States.

The Dellwood is equipped with an automatic steering device known as the "gyro-pilot." This machine shows instantly the least movements of the ship's head and is quicker than the steersman's brain to note the yaw or periodic departure of the vessel from her course and to apply the corrective helm. It is a well-known fact in navigation that a human being cannot steer a straight line on the ocean, but a curve; and the gyro-pilot lays a course so much straighter that, in the case of the cable-ship Dellwood, it is expected by the war department to save enough cable at $1,000 a mile to pay for the device ten times over.

The Dellwood is the only deep sea cable-ship flying the American flag, and she has been on cable work for years, her crew being expert layers, splicers, operators and navigators. This is why; Submarine cables, when well made, often go for years without break or interruption. The old Alaskan cable, contrary to this, has for many years been breaking badly, in 1923 alone there were eleven breaks, keeping the Dellwood employed nearly all of the time.

The new cable is much larger than is needed for army communications at present, but is being laid with an eye to the future when a transpacific cable, owned by the United States and lying for the most part in United States waters, may exert a powerful influence for this country in its relations with the far east.

Coupled with the startling announcement by Major General George O. Squier, former chief signal officer of the army, last week, that the army had successfully completed tests for the combined telegraph, cable and radio sending, receiving and conducting system, and linking up with the fact that the Radio Corporation of America, headed by the army's former deputy chief of staff, General Harbord, is stretching out its myriads of tentacles all around the globe, the question of America's "isolation" may be regarded purely as a political one.

The signal corps marvelous invention of the three-way system has been heralded as ushering in a new era in communications. It makes it possible to send any number of messages over the same wire from Washington or New York to Seattle or San Francisco, where they continue automatically without being relayed, on the deep-sea cable line to its end. There the messages, by automatic machinery, are broadcast in the air as radiograms. And all this by merely sitting down to an automatic sending device, with a typewriter keyboard, and writing off the messages at the starting point.

The stupendous task of the army signal corps men in making this electrical miracle possible has taken years, but it is now perfected and is being used on the old Alaskan cable. The speaking voice over a telephone has been automatically broadcast as radio and land telegraph wires have been hooked up with deep-sea cable wires, but the whole combination has never been developed before.

Another feature of the device is that it sends scores of messages over the same land or sea wire at the same time by a multiplex brush system known as the "key system," which synchronizes the mixed-up jumble of dots and dashes and sorts them out with amazing speed at the receiving end much after the manner in which a machine gun fires hundreds of shots per minute through the propellers of a speeding airplane without once hitting the blades.

That part of the system, however, was mechanical. The biggest problem was to synchronize the low frequency land wires with the sub-audio radio frequencies. It appeared that the two systems were so diametrically opposed that it was impossible, but the frequency of the land or cable wire was made into an alternating circuit, and the oscillations solved the question. This necessitated putting the radio elec-

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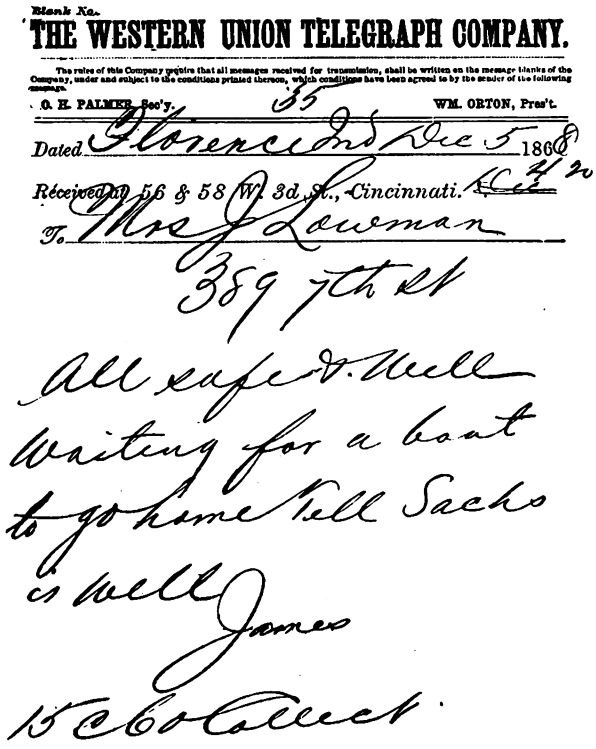
tron tube system into the telegraph and cable, which has been done, with the result that the land and sea wire messages are really radio traveling on wires and leaping out as honest-to-goodness radio at the end of the wire.

An Old Telegram

WE reproduce an old telegram that was sent to us by L. R. Scholl, city superintendent, Western Union Telegraph Company, Cincinnati, Ohio. This message was sent to us by Mr. Scholl, no doubt, for the benefit of the service. It will be noticed that the writing on the message blank is that of an experienced penman and in those early days of the telegraph the Cincinnati, Ohio, office could boast of good penmen.



Blank No.

THE WESTERN UNION TELEGRAPH COMPANY.

The rates of this Company require that all messages received for transmission, shall be written on the message blanks of the Company, under and subject to the conditions printed thereon, which conditions have been agreed to by the sender of the following message.

O. H. PALMER, Sec'y. 35 WM. ORTON, Pres't.

Dated Florence Ala Dec 5 1868

Received at 56 & 58 W. 3d St., Cincinnati. 4 20

To Mrs J Lowman

389 7th St

All safe & well

Waiting for a boat

to go home Tell Sacks

is well

James

15 Collect

Old Time Telegraphers' and Historical Association

R. S. STATLER, manager of the Atchison, Topeka and Santa Fe Telegraph Office, Chicago, has sent us two autographed albums. These albums contain the signatures of Pennsylvania Railroad operators in 1884 and in 1910. A large portion of one of the albums is given over to the signatures of persons who have been operators on the Santa Fe and other railroads to date. These two albums have been placed in the archives of the Old Time Telegraphers' and Historical Association for future reference. J. B. Taltavall, publisher of Telegraph and Telephone Age, 253 Broadway, New York, is historian of the Old Time Telegraphers' and Historical Association and he will be glad to receive anything that would add to the value of the Old Timers' collection. This matter becomes more valuable as the years pass by.

Chronology of the Telephone Business

1875 First words transmitted by telephone.

1876 First complete sentence transmitted by telephone.
First conversation by overhead line, 2 miles—Boston to Cambridge.

1880 30,872 Bell Telephone stations in the United States.
Conversation by overhead line, 45 miles—Boston to Providence.

1881 Conversation by underground cable, ¼ mile.

1884 Conversation by overhead line (hard-drawn copper), 235 miles—Boston to New York.

1890 211,503 Bell Telephone stations.

1892 Conversation by overhead line, 900 miles—New York to Chicago.

1900 676,733 Bell Telephone stations owned and connected.

1902 First conversation by long-distance underground cable, 10 miles—New York to Newark.

1906 Conversation by underground cable, 90 miles—New York to Philadelphia.

1910 5,142,692 telephone stations in Bell System.

1911 Conversation by overhead line, 2,100 miles—New York to Denver.

1913 Conversation by overhead line, 2,600 miles—New York to Salt Lake City.
Conversation by underground cable, 455 miles—Boston to Washington.

1915 First conversation by transcontinental line, 3,650 miles—Boston to San Francisco.
Speech transmitted for the first time by radio telephone from Arlington, Va., across the continent to San Francisco, over the Pacific to the Hawaiian Islands, and across the Atlantic to Paris.

1920 11,795,747 telephone stations in Bell System.

1921 Conversation by deep sea cable, 115 miles—Key West, Fla., to Havana, Cuba. First conversation between Havana, Cuba, and Catalina Island by submarine cable, overhead and underground lines and radio telephone—distance 5,500 miles.
Extension of Boston-Philadelphia cable to Pittsburgh—total distance 621 miles. President Harding's inaugural address delivered by loud speaker to more than 100,000 people.
Armistice Day exercises at burial of unknown soldier delivered by means of Bell loud speaker and long lines to more than 150,000 people in Arlington, Va., New York and San Francisco.

1922 Ship-to-shore conversation by wire and wireless between Bell telephones in homes and offices and the S.S. America 400 miles at sea in the Atlantic.

1923 Successful demonstration of trans-oceanic radio telephony from a Bell telephone station in New York City to a group of scientists and journalists in New Southgate, England.
First broadcasting of a presidential message to Congress, December 6.

1924 15,000,101 telephone stations in Bell System.

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Navigation by Wireless

It is hardly possible to exaggerate the value of wireless direction-finding as applied to shipping and aircraft. The mariner approaching a coast naturally looks out for lighthouses and prominent landmarks, but, owing to the curvature of the earth's surface, his range of vision is very limited, and in the case of fog such points can be of no assistance. Wireless, however, knows no such limitations, and distances of hundreds of miles can be covered with ease. The bearings thus obtained are usually accurate to within two degrees, and although this is a wider margin of error than permitted in astromical observations it is of the greatest value when weather conditions prevent the ordinary observations being made. It is also possible that in those areas where shipping conditions require the assistance of wireless it will be found possible to erect a number of shore stations not more than fifty miles apart, and by plotting on a chart the information thus obtained to determine the ship's position within narrower limits.

The principle on which most direction-finding systems depend is that of an aerial composed of a loop of wire connected to suitable apparatus. If the loop is turned slowly round, it is found that the strength of the received signals alters and that there are two positions of maximum loudness and two of silence for one revolution of the loop. The maximum positions are exactly opposite, as are also the minimum or silence positions, and are at right angles to each other. When the loudest signal is obtained the loop is pointing, end on, to the transmitting station, and the reason for the change in signal strength is accounted for by the way in which wireless waves travel over the surface of the earth The actual amount of energy received by the loop is very small indeed, and although this directional property of loops has been well known for some time it was not possible to utilize it fully until the genius of Professor Fleming gave the world the wonderfully sensitive method of detecting etheric waves by means of his thermionic valve.

Fog is bad enough at sea at any time, but the vessel thus beset can nearly always come to a standstill or proceed slowly, giving audible warnings. Not so easy is the case of the aeroplane lost in a fog or when the landing-place is shrouded in mist. The application of the latest form of direction-finding to aeroplanes has, however, robbed the difficulty of most of its terrors, and it is now possible to fly a machine from London to Paris or Amsterdam with its head continually held in the correct direction, and the operation is so easy and successful that it has been found to inspire great confidence in the pilot. An interesting test was carried out not long ago when an aeroplane was sent up with no other instructions than to find a ship somewhere which would transmit a signal every few minutes. The aeroplane ascended from Biggin Hill, Kent, and for all the pilot knew the ship might have been in the North Sea or the Channel. The direction-finder led the aeroplane straight to the ship, which was found some miles south of Brighton, though the visibility on this occasion was so bad that the pilot could not see the vessel until he was within two miles of it.

It has now been found possible to concentrate wireless energy more or less in one direction in the same way in which the beam of a searchlight is projected by mirrors. Marconi has developed such a system, using only a very short wave-length. The "mirror" in this case consists of a number of vertical wires all tuned to the same wave-length as the aerial, which is placed at the focal centre of the system. Thus the energy reflected and sent out approximates to the beam of a searchlight, though it is, of course, not so perfect as the beam known in optics. The whole aerial and reflector is turned slowly like the revolving lantern of a lighthouse, and as it passes each point of the compass a definite signal is sent out. This signal is only heard by a ship when the beam is pointing directly towards it, and thus it is as efficient as the familiar lighthouse without the difficulties of visibility that so constantly occur round our coasts. The system was installed some time ago at Inchkeith, in the Firth of Forth, and although the working range at present does not exceed ten miles the working has been very satisfactory.—British Science Guild News Service.

For Sale

SINCE the death of Thomas J. Dunn on March 31st, 1923, the Dununit transmitting device has not been manufactured. Counselor Jerome J. Dunn, a son of Thomas J. Dunn, is selling out the business and offers for sale the letters patent covering the Dununit and all of the other transmitting devices invented by Mr. Dunn. It will be remembered that T. J. Dunn was the first in the telegraph field to realize the importance of transmitting devices and he associated himself over twenty years ago with the original inventor of the Vibroplex, Horace G. Martin. The patents that are now offered for sale have a life of thirteen years and do not infringe any other transmitting device. For particulars address Dununit, c/o TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

International Telephone and Telegraph Co.

AT the annual meeting of the International Telephone and Telegraph Company at Boston, on May 16th, H. D. Orde, vice president and treasurer was elected a director to succeed M. C. Rorty. Other directors were re-elected.

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EDITORIAL COMMENT

Clarence H. Mackay on the Future

AT the recent dinner in the Hotel Commodore, New York, to commemorate the fortieth anniversary of the founding of the Commercial Cable Company and the Postal Telegraph-Cable Company, Clarence H. Mackay, the president of those companies, in his remarks reviewed the history of the telegraph and cable and in conclusion stated:

"As for the future of electrical communication, I feel that we are on the eve of still greater accomplishment. I believe that the next forty years will be marked by a great advance in the art providing that its expansion and development are left to that same individualistic spirit which has made this country great and which has so outstandingly justified itself where electrical communication in its various forms is concerned. The great menace to progress in the world today is the ambition of a certain group of self-seeking people to place every phase of human activity under governmental ownership and direction and to place life, liberty and the pursuit of happiness under bureaucratic country This tendency is becoming very marked in our own country.

"Everyone with a desire to restrict the business activities or pleasure of someone else or to promote some pet scheme now rushes to Washington or to our State Capitols for legislation. Up to twenty years ago Washington interfered but little in the life of the American people. Today the activities and powers of the Federal bureaus reach into almost all of our social and business existence with the emphasis on our pocketbooks. This country became great and prosperous because it was the least governed of all nations. It advanced while Europe struggling under the load of bureaucratic control, was retrograding. I believe, touching for a brief moment upon past history, that extreme paternalism during the last half century in Europe, by stunting individualism and progress, was largely responsible for the economic situation resulting in the great war in 1914. Perhaps Europe is at last seeing the light, for the past two years have witnessed a strong movement away from paternalism. One outstanding man who has realized the fallacy of extreme governmental bureaucracy is that great patriot and statesman, Premier Mussolini of Italy, who has been and is endeavoring to unfetter Italy's arteries of transportation, and likewise her telephone and telegraph facilities, and to foster the spirit of individual effort in their operation and expansion.

"If this country is to continue the progress of our fathers, we must change our present tendencies and get back to the public policies of our fathers. The phenomenal development of the cable, telegraph, telephone and radio in the United States, as opposed to the decidedly faltering progress in these arts in foreign countries, is entirely due to the free and untrammeled rein which has been given in this country to private initiative and enterprise under the spur of competiton.

It is pertinent to refer to a fact which will no doubt surprise many—the fact that in spite of advanced and high cost of operation, in spite of general price advances affecting practically every phase of our industrial and social life, in spite of this, Atlantic cable rates have not advanced in the past forty years, but have actually declined. The only advance in telegraph rates over a period of forty years was made forsooth by Postmaster General Burleson in 1919, during his deplorable and never to be forgotten period of government control. However, the introduction of the day letter and night letter by the telegraph companies has brought the cost of telegraphing below what it was forty years ago. In fact the American telegraph rates today are the lowest in the world. This is a record of rates on the cables and landlines which challenges comparison and speaks volumes for what competition and private initiative have done for the American public.

"That we may be able to continue along the even tenor of our way is my earnest hope, so that on the eightieth anniversary of the Commercial Cable-Postal Telegraph System we may be able to make a report of further progress and of constructive and honorable service in the interest of our beloved country."

Bulls on Phillips' Code

MR. TALTAVALL:

Here are a few stories of bulls I have seen. Bulls I have seen on the Phillips' Code. As you know "pox" is code for police. A few years ago a story came out of Fremont, Ohio, regarding the prevalence of small-pox. The story went on to state that "it was feared the schools would have to close on account of an epidemic of small police." This item was passed by the copy reader and appeared in print, a clipping of it being posted in the telegraph room of a newspaper. I saw it.

Notice the marked clipping "but good buying support was for the morning and net losses," etc. "For the morning" should read FORTHCOMING. Can you beat it?

One of the boys to whom I sold a code book approached me a day after and asked if I knew the code for "benevolence." I told him there was none. This did not satisfy him. He said: "What is the abbreviation for benevolence?" Without any attempt at being funny I replied:

"Benevolence is so rare it ought never to be abbreviated." Some of the other operators heard of it and accused me of being damn original, if not funny.

H. C. OSTRANDER, *Toledo, Ohio.*

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A SPLENDID ELECTRICAL LIBRARY

Hawkin's Electrical Guide contains ten wonderfully helpful and practical volumes, written in clear, concise language, easy to understand, no wasted words, full up-to-the-minute electrical knowledge, which can be applied to problems that come up from day to day. You can carry a number of the books with you until you have mastered the subjects. All subjects are indexed so that you can find the information instantly. Written in the modern question and answer form. It's like having an electrical authority always at your elbow ready to answer any question you ask. 4700 pictures, 3500 pages, pocket size, flexible cover; price $10.00 for the full set of ten books. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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THE UNIVERSAL SELECTOR
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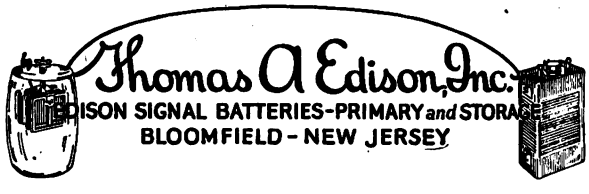
And for the Less Important Stations, too---

Railway Telephone Engineers occasionally tell us that their "more important telephone stations are all equipped with Edison Primary Batteries, but for the unfrequently used way stations, dry cells are still being used."

But—Edison Primary Batteries produce electricity at a less cost per ampere hour than does any other form of primary battery. As a matter of fact their advantage over dry cells is relatively greater in this lighter service, because dry cells have the handicap of a limited "shelf" or "stand-by" life. Full utilization cannot, therefore, be made of their capacity in this service.

The capacity of the Edison Primary Battery is normally from ten to twenty times that of a dry cell battery. And—most important of all—it does not matter whether you use up its capacity in three months or three years. You can always count on getting full measure, whenever and however you may want it.

Let us tell you about the other points of great advantage found in Edison Primary Batteries, which are of even more importance than this matter of proven economy.



ST. LOUIS Railway Exchange Bldg. CHICAGO Peoples Gas Bldg. SAN FRANCISCO Balboa Bldg.

2016-36

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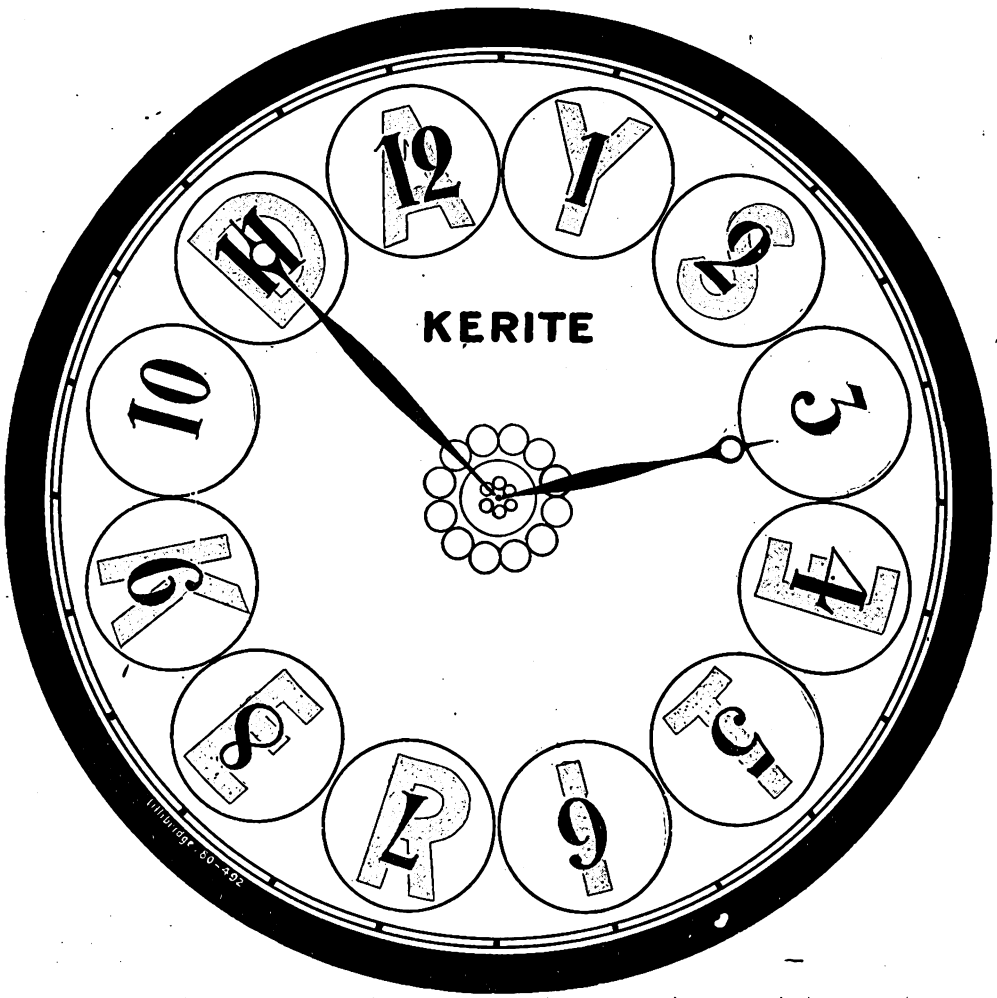

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

A MEETING of Committee No. 11—Telegraph and elephone Transmission will be held at 30 Vesey treet, New York City, on June 5.

A meeting of Committee No. 7—Inductive Intererence will be held at 30 Vesey Street, New York ity, on June 3 and 4.

A meeting of Committee No. 2—Construction and laintenance—Inside Plant will be held at Hotel addon Hall, Atlantic City, N. J. on June 11 and 12.

Canadian National Telegraphs

THE Toronto and District Council Cricket match etween Dovercourt and the Canadian National ailway Cricket Club, on May 17th, resulted in win for the latter by: 9 wickets, and 117 runs.

Dovercourt—Badger, W., lmb, b. Wilson, 4; rving, A., 1; Simmons, J., bowled Wilson, 7; rant, G., bowled Huddlestone, 6; Colborne, F., owled Huddlestone, 5; Newell, J. L., bowled uddlestone, 0; Goodman, J. C., Fyfe B., Huddlestone, 11; MacPhee, N., B. Huddlestone, 0; arker, D. C., 1; Langridge, J. W., bowled Fyfe, ; Gould, J., c, Smith bowled Huddlestone, 0; xtras, 3; total 39.

Can. Natl. R. C. C.—Davison, J,, bowled Simons, 53; C. D Wilson, 102; extras, 1; innings eclared closed, 156. W. Stobbes, A. Duncan, W. uddlestone, C .D. Fyfe, W. Smith, A. Radford, R. Smith, Weedon and Hockey did not bat.

The Canadian National Railway team batted first, and thanks to the noteworthy contribution of C. D. Wilson with 102 runs not out, were able to declare the innings closed after the fall of the first wicket, with a score of 156 runs. Mr. Wilson's century included 20 boundaries, and proved him to be an excellent batsman. J. Davidson's contribution of fifty-three runs was also very valuable, and also indicates that his value to the team will be more pronounced than ever. His half century included seven boundaries, one three, and three twos.

For Dovercourt Mr. Goodman was high bat with a score of 12 runs.

The bowling analysis reads as follows:

W. Huddlestone, 8 overs, 6 wickets, for 19 runs; C. D. Wilson, 7 overs, 2 wickets, for 14 runs; C. D. Fyfe, 2 overs, 1 wicket, for 3 runs

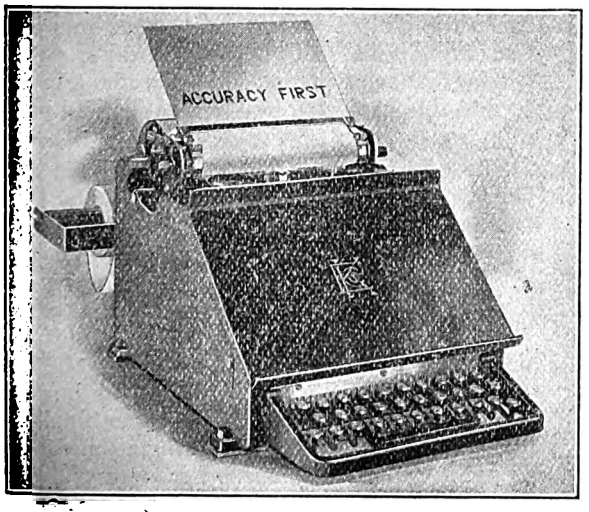
On this showing the Canadian National Railway Cricket Club have every reason to be congratulated, and it is hoped that they will turn in many similar performances.

Coming Conventions

OLD Time Telegraphers' and Historical Association, Hotel Roosevelt, New Orleans, La., October 30th, 31st and November 1st.

Telephone Pioneers of America, Chicago, October 10th and 11th.

Telegraph and Telephone Section of the American Railway Association, Hotel Frontenac, Quebec, Que., September 9th, 10th and 11th.



"SAY IT TO THE OTHER END IN WRITING."

Four Telegraph Typewriters enable one Railroad to move freight cars twenty-four hours earlier than before the installation was made.

These typewriters are in series on a way wire connecting freight yards, piers and general offices. Motor generators are eliminated by equipping the alternating current points with A. C. motors. All relays are eliminated and although the typewriters are connected electrically like main line sounders, no adjusting is necessary during wet weather conditions.

The machines are used continuously. During the day the messages and waybills are taken from the machines as they are received. At night the receiving clerks go home but the machines stay "on the job to take the message." All night long they receive without human aid.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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Radio Corporation of America

GENERAL JAMES G. HARBORD, president, has been speaking at several social functions of late and his speeches are invariably broadcasted. He is a pleasant and forcible speaker.

The Advertising and Publicity Department and the Credit Accounting Department have been moved from Room 1801 to 1868, Woolworth Building.

David Sarnoff, vice president and general manager, was a speaker at the National Electric Light Convention at Atlantic City last week.

The Board of Directors at their meeting on May 23d, declared a dividend payable on all Preferred Stock of the Radio Corporation, to stockholders of record on June 6th. The dividend will be 3½ per cent being 1¾ per cent. respectively, for the first and second quarters of 1924.

All America Cables

AUDITOR J. J. HALPIN has been appointed comptroller of the company, New York.

Traffic Engineer A. Cunningham has returned to New York from the Canal Zone and Cuba, where he has been on an inspection trip.

Manager M. Hurst arrived at La Paz, Bolivia, and assumed the duties of manager, vice T. H. Burns, on furlough.

Supervisor J. P. Menzie left Punta Arena, Costa Rica, on furlough to be spent in Nova Scotia.

A. J. Brady has arrived at Salena Cruz, Mexico, where he assumed the duties of manager, vice W. Wiseman, chief inspector of land lines, who returns to Mexico City.

Vice President J. K. Roosevelt has left New York for Mexico City.

OBITUARY

Major Robert Burns Hoover, aged eighty-one, years, an old telegrapher and a member of the United States Military Telegraph Corps, during the Civil War, died at Los Angeles, Calif., on May 10th, to which place he had retired several years ago. Mr. Hoover originated the proposition to erect the Morse Statue in Central Park, New York City, in 1871. It was Mr. Hoover's idea to collect $1.00 each from operators all over the country. He carried on the campaign for this fund until the statue to Professor Morse was erected. He was manager, after the Civil War, of the Western Union Telegraph office at Allegheny City, Pa., and Washington Court House, Ohio, and other places. He was made superintendent of telegraph for the Pittsburgh, Marietta and Cincinnati Railroad Company, and was with that company for several years when he accepted the managership of the Central Union Telephone Company at Springfield, Ill., later being transferred to Springfield, Ohio, where he remained until the spring of 1915, when he was retired on pension by the company.

Receiving a generous pension from the Bell Telephone Company in addition to the Carnegie pension, Mr. Hoover was comfortably situated and passed the late years of his life in comfort and leisure and expected to live for many years more. A letter recently written by him to E. W. H. Cogley, of Lewistown, Pa., his brother-in-law, urged him to come to Los Angeles and "live to be a hundred," as Mr. Hoover hoped and expected to do.

Mr. Hoover was born at Lewistown, Pa., and received his education in the Public Schools and Academy of that town.

GEORGE KENNAN, aged seventy-nine years, the well-known traveller, investigator and writer, died at his home at Medina, N. Y. on May 10th, after a three-day illness of paralysis.

He suffered two strokes of apoplexy. He never regained consciousness from the second stroke until the time of his death.

George Kennan had a remarkable career as a traveller, investigator, and writer. His most notable achievement was his laying bare to the world the cruelties and horrors of the exile system by which the Russian autocracy threw nearly a million subjects into the wilds of Siberia. His depiction of conditions which he found among the Siberian exiles stirred the whole world, and it is credited with having been a factor that led to the final mitigation of the cruel practices.

One of the most interesting things in Mr. Kennan's career is the manner in which he entered upon it. Born at Norwalk, O., Feb. 16, 1845, he was, in his 18th year, working as a telegraph operator at Cincinnati when, one night in 1863, a message came over the wire asking him if he would like to join an expedition which was to be sent to Siberia to ascertain whether telegraphic communications could be maintained continuously through that country. Those were the days when it was thought that the only way to establish telegraphic communication between the United States and Europe was by way of Canada, Alaska, the Behring Straits, Siberia and Russia, it being then generally thought that the ocean cable projected by Cyrus W. Field had proved a failure.

The offer which Kennan had received through a fellow operator on the wire was made by the Collins Overland Telegraph Co. Although Mr. Kennan had never heard of the concern, the spirit of adventure led him to accept. He went to Siberia and was soon placed in charge of the expedition, which spent over two years in traveling thousands of miles by sledge and making practical tests as to the feasibility of the telegraph there. Kennan was buried in the wastes of Siberia when a messenger finally reached him from St. Petersburg, bringing news that the second Atlantic cable had been successfully laid and the overland route had been abandoned.

Mr. Kennan came home, but he had become so interested in Siberia that he shortly returned there, seeking new adventures. He wrote his first book, "Tent Life in Siberia," in 1870, and the following year explored the Eastern Caucasus, twice crossing the great range. He became connected with the New York Associated Press in Washington in 1878 for

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The Road to Home

Though written faithfully, his letters from home seemed to have had a way of arriving at his hotel in one city just after he had left for the next —and of never catching up.

Three weeks passed—business conferences, long night journeyings on sleepers, more conferences—with all too little news from home.

Then he turned eastward. In his hotel room in Chicago he still seemed a long way from that fireside in a New York suburb. He reached for the telephone—asked for his home number.

The bell tinkled cheerfully. His wife's voice greeted him. Its tone and inflection told him all was right with the world. She hardly needed to say, "Yes, they are well—dancing right here by the telephone. . . . Father and mother came yesterday. . . . Oh, we'll be glad to see you!"

* * * *

Across the breadth of a continent the telephone is ready to carry your greetings with all the conviction of the human voice. Used for social or business purposes, "long distance" does more than communicate. It projects you—thought, mood, personality—to the person to whom you talk.

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a number of years when he was engaged by the Century Magazine to go to Russia to investigate the condition of the Siberian exiles. He travelled 15,000 miles in Northern Russia and Siberia, and the results of his observations in magazine and book form, entitled "Siberia and the Exile System" were the most comprehensive and fearless expositions that had ever been made of the merciless practices of the exile system. He supplemented his written work by lectures both in the United States and Europe, and in his later years was a correspondent for the Outlook.

WARREN Y. SOPER, aged seventy years, a well known and respected citizen and an old time telegrapher of Ottawa, Ont., died in that city on May 13th. Mr. Soper was president of the firm known as Ahearn and Soper, Ltd., and vice-president of the Ottawa Electric Railway System.

Mr. Soper was born in Maine and moved to Ottawa with his parents when two years of age in which city he has been a resident ever since. Mr. Soper was manager of the Dominion Telegraph Company at Ottawa and later superintendent of the Canada Mutual Telegraph Company. He retired from direct connection with the telegraph in 1882 and since that time, has been president of Ahearn and Soper, Ltd., this firm is known throughout Canada as electrical engineers and contractors.

The late Mr. Soper was connected for many years with a large number of Canadian corporations of high standing. He had been for years vice-president of the Ottawa Car Company, vice-president of the Ottawa Street Railway Company and connected as dircetor with the Imperial Life Insurance Company, Canadian Westinghouse Company, Frost and Wood Company, Canadian Locomotive Company, Ottawa Light, Heat and Power Company, Ottawa Valley Motor Association, and Central Canada Exhibition Association. He was for many years vice-president of the Ottawa Electric Company, president of the Dunlop Tire and Rubber Goods Company, president Ottawa Building Company, vice-president of the Ottawa Traction Company, vice-president of the Ottawa Gas Company, and president of the Gas Accumulator of Canada Ltd.

He was a member of the Rideau Club, Royal Ottawa Golf Club, Ottawa Hunt and Motor Club, Country Club, Mount Royal Club, Montreal and York National, Toronto. He resided at Lornado, Rockcliffe Park, where his beautiful house and grounds are one of the show places of Ottawa. In 1910 the Toronto Saturday Night rated the late Mr. Soper as a millionaire and stated of him: "A big man in finance and industry, with a fondness for art and a love for literature which together tend to make him a man of rare culture."

H. M. Byllesby, Aid to Edison, Dies in Chicago

HENRY M. BYLLESBY, aged sixty-five years, a native Pittsburgher, former assistant to Thomas A. Edison, and a pioneer engineer and promoter of electrical gas and other utilities, died on May 1st, in Chicago.

Mr. Byllesby had been in failing health for several months and returned to Chicago about two weeks ago from California, where he had gone in an effort to recuperate.

During the World War, Mr. Byllesby, with the rank of lieutenant colonel, was purchasing agent in Great Britain and Scandinavia for the American Expeditionary Forces, with headquarters in London. While he was in London, he was awarded the Distinguished Service Order, a British citation.

He was graduated from Lehigh University, and on June 15, 1882, he married Margaret Stearns Baldwin of Roselle, N. J., whom survives him.

Mr. Byllesby left Pittsburgh when a young man and was associated with Mr. Edison in the early days of his electric experiments in New Jersey, and has been identified with many movements and advances in electrical enterprises.

At the time of his death he was president of H. M. Byllesby & Co., engineers of Chicago.

THOMAS COMMERFORD MARTIN, aged sixty-seven years, died on May 17th of pneumonia at the House of Mercy Hospital, Pittsfield, Mass., where he was brought on May 16th from his country place in Worthington. He was born in London, England and was associated with Edison from 1877 to 1879 and was editor of the Electrical World from 1883 to 1906 and since then has been Executive Secretary of the National Electric Light Association.

In 1907 he was decorated by the French Government as an officer of public instruction. Mr. Martin was a member of the Engineering College, George Washington University, of the Executive Committee of the Safety Institute of America and of a large number of electrical and other scientific clubs and societies. He was the author of "The Researches and Writings of Nikola Tesla" and of "The Life and Inventions of Edison." He also was a frequent contributor to reference books and magazines and was Chairman of the Marconi Fund for Italian War Relief.

J. D. ELLSWORTH of the Publicity Department of the American Telephone and Telegraph Company, 195 Broadway, New York, has been promoted to be assistant vice-president of the company in charge of publicity. W. P. Banning has been appointed to fill Mr. Ellsworth's place.

Mr. Ellsworth will advise generally as to publicity policies, initiate plans and further co-operation and consistency. In short, he will continue to be leader in publicity work, but with a larger field for his endeavors.

Telegraphers Strike in France

A SECTION of the telegraphers employed by the great French wireless company known as Radio France, went on strike on May 17th. The men demanded an increase of wages from ($40) 500 francs per month their present minimum pay to ($45) 600 francs per month. Inquiries at the company offices elicited the statement that the strike concerned only a portion of the staff and that it in no way caused any interruption of traffic. There appears to be some anxiety however as to whether British and American wireless telegraphers may not also cease work, in sympathy with their French comrades.

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POSTAL TELEGRAPH-CABLE CO.

WILLIAM B. DUNN, secretary, recently spent a few days in Syracuse and Rochester, N. Y., on company business.

T. N. Powers, assistant traffic manager, is leaving for Chicago and Cleveland, at which latter place he will take charge of traffic matters in connection with the Republican Convention.

The engineering work of the Eastern Division has been taken over by A. C. Johnson as assistant engineer.

R. Gould, general supervisor of plant, is now in Arizona, in connection with the construction of the new line between Fort Worth and Los Angeles.

The quarters formerly occupied by the bookkeeping department on the ninth floor at 253 Broadway, New York City, are now being fitted up as an addition to the engineering department.

New York City

CONGRATULATIONS of the force are extended to Harry Cuddy, and C. Musraca on the arrivals of Miss Cuddy and Master Musraca.

Frank Ferrante, with his new traffic chart is a noteworthy addition to the general traffic desk on the day tour. After many years on the night force, he is delighted with his new trick.

Tom Flynn has bought a new Chevrolet, and is planning a trip through the Pocono Mountains on his vacation.

THE Big Springs, Texas, Herald, under date of April 18th, states that a construction crew of the Postal Telegraph-Cable Company has completed their line through Big Springs and are now working West of this city.

This is about the busiest bunch of men says The Herald we ever saw as they are on the job early and late. If the other construction crews along the line work at a similar pace it will not be long before the entire line from Fort Worth to Los Angeles is completed.

Officials of the company were at Big Springs, securing measurements of the building at 112 Main St., which will be used as a commercial station and also relay station. Fixtures for this office will be up-to-date in every respect.

Commercial Cable Company

H. F. RUSSELL, manager in England, who arrived in the United States on April 11th, returned to London on the steamship Aquitania on May 28th.

T N T Steel Galena

T N T STEEL GALENA and one Desert Cactus Cat Whisker, price fifty cents each. This galena has been produced to make the wireless telegraph and telephone most efficient and that it accomplishes its work is testified to by all users. It is made in California and fills a long felt want. Agents wanted everywhere. Address Telegraph and Telephone Age, 253 Broadway, New York.

THE WESTERN UNION TELEGRAPH CO.

S. B. HAIG, general supervisor of traffic service, is spending his vacation in the vicinity of New York.

Charles E. Davies, acting general manager of the Canadian National Telegraphs, Toronto, Ont., was a recent executive office visitor.

W. J. Blenheim, American traffic manager of cables, and R. O. Jones, general inspector in J. J. Welch's office, New York, are on a trip of inspection in the South.

A new two conductor cable has been laid from Punta Rassa to Key West, Fla., and it was put into operation on May 27th.

New York Western Union

HENRY HUDSON is spending a furlough, touring all the European big Cities. The last heard from Mr. Hudson he was in Paris enjoying a much needed rest.

Percy Purcell was another distinguished passenger on the steamship Adriatic on a previous trip across the Atlantic. Mr. Purcell, hopes to visit all the important points of interest "over there."

George Jolly, has just returned from his vacation. Mr. Jolly spent most of his time in the flower gardens around his new home in Richmond Hill.

W. T. Kilmartin is on vacation.

Jimmy Anisman, the genial secretary of the Commercial News Department local is spending his vacation at Atlantic City, N. J.

A word from the pensioners; Miss Julia Marks has reopened her summer home at Suffern, N. Y.

Edward Remer, on pension was a recent visitor at 24 Walker St.

ROBERT J. GRAY, operator, 304 St. Nicholas Avenue, Harlem, N. Y. is sixty-seven years of age and is still going strong. He went with this Company as a messenger in Philadelphia in 1870 and was appointed operator in 1871 and has been with the company ever since. Mr. Gray is now on a two weeks' vacation, spending most of his time at his old home in Philadelphia. Mr. Gray acted as representative for Telegraph and Telephone Age in 1888 and was one of the best agents the paper has ever had.

Chicago

Now and then, those of us who work together, face a breaking up of some particularly harmonious association, and realize keenly that what has seemed to be a purely business relation is in fact, a deep and abiding friendship. This was the case with the Chicago organization of the Company, when Harry W. Baker, for many years manager of the credit department, resigned to accept a position as sales-manager for a large and growing lighting-fixture company.

By reason of his wholesome genial disposition, his kindness and courtesy to all during the long years he had worked, Mr. Baker has made a host of

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friends; but how many, not even he realized until he looked around City Superintendent H. Brown's office on the afternoon of May 19, and saw gathered there as many officers and employees as could be comfortably wedged in.

His own department had, the day before, given Mr. Baker a complete and very attractive smoking set, including the "latest model'" humidor, and this day, his many friends and associates in the other departments, presented him with a silver loving cup and a gold mounted card case. M. F. Strider, office manager in the City Superintendent's office, made the presentation in his inimitable friendly way, recalling the many years he and Mr. Baker had worked together and forecasting the success that was sure to follow him into his new field and giving him as a parting gift, not only the material evidence of his friends' good will, but what meant far more to him the assurance of their loyal affectionate regard. Mr. Baker's leaving is a distinct loss to the Chicago organization and a source of sincere regret to everyone in it.

The Milwaukee, Wisconsin Journal, May 5, maintains an "Inquisitive Reporter" whose duty it is to perambulate the streets of a Socialist stronghold and ask such questions as this of several persons chosen at random:

"Does it seem to you that the study of vertabrate paleontology affects to any pronounced degree, in the light of astro-physical phenomena, the established periodicity appertaining by and large to nationally observed holidays?"

Tommy Briggs, Western Union messenger, replied:

"Better make it a night letter mister; 90c. for 50 words."

L. F. Baker, for many years associated with this Company at Chicago, and now in General Manager A. C. Cronkhite's office, celebrated his seventieth birthday on May 16. He says hard work and plenty of it is the only antidote for the perils of old age, and at his present speed, he expects to round out the century.

Director of Traffic Production, Samuel Reber, of the Radio Corporation of America, was in Chicago recently, renewing his acquaintances with old Western Union friends and associates some of whom had known him as a dashing army officer on the Mexican border, when Texas was a part of the old Second District, Western Division.

CHICAGO has organized what is believed to be the only Western Union choral society in the system. The roster contains at present, the names of 84 exclusive Western Union employees, the greater number of whom have exceptional talent, as well as considerable previous training and experience with other singing societies.

Rehearsals under the direction of a professional coach, are held weekly, with periodic rehearsals between times for the different sections.

Plans are under way to hold a public concert the latter part of June.

A. C. Johnson, Assistant Chief operator, is president of the new organization and George V. Hack of the General Manager's office is secretary.

ON Thursday evening, May 1, the Chicago messenger band gave a concert at the Old Folks Home and the following letter from the eldest member of the Home family, Mrs. L. E. Fessenden, indicates that the band scored a success.

To the messenger boys of the Western Union band:

May not an old lady, who is nearing her 93rd year and has been in the Old Folks home twelve years, express her thanks for the pleasure your concert gave her on the evening of May. 1.

When I heard those sweet notes
And soul inspiring strains,
Long years rolled back for me,
And I was young again.

Brown curls were on my brow,
My face was young and fair,
My lover stood beside me,
My girlhood friends were there.

My feet were young and strong,
Gone were earth's sham and husk,
The while my feet danced nimbly
To the tune of "Money Musk."

Bless you for your kindness,
May your future brighter be,
For that one hour in which you gave
My girlhood back to me.

T. L. SIMON, manager of the delivery department at St. Paul, Minn., who has "carried the message to Garcia" in handling the forty boys who furnish the company's direct contact with the public, has been rewarded by promotion to the position of superintendent of delivery at St. Louis, where he will have charge of 200 boys.

Mr. Simon, or "Si" as he is known to his numerous friends, will take up his new work and will be succeeded at St. Paul by Dale Elston, transferred from the night managership at Wichita, Kan.

Mr. Simon was born and reared in Stillwater and went to work for the Western Union as a messenger when he was fourteen years old, or just half as old as he is now. In his fourteen years with the company he has been promoted through the grades of messenger, telegraph operator, night manager and manager in a number of offices in Minnesota, Wisconsin, North Dakota, South Dakota and Nebraska. He came to St. Paul to manage the delivery department two years ago. Prior to that he had been manager of delivery at Omaha from 1920 to 1922. His previous assignment had been as operator at Bismarck, N. D.; operator at Virginia, Minn., manager at Owatonna; manager at Lake Geneva, Wis.; night

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manager at Minneapolis; manager at Austin, Minn.; manager at Albert Lea, Minn. and assistant manager at Sioux Falls, S. D.

That accounts for the time since his messenger days at Stillwater, with the exception of six months in the army, which he broke into after clearing the way by having an operation performed at Rochester. In the army he was instructor in wireless at the Dunwoody Institute, Minneapolis.

Here's "Si's" formula for handling boys:

"Treat them human. Treat them as if they were men. Take them into your confidence and encourage them along. Say 'please' to them. You can't order boys around any more than you can order men; in fact they'll buck worse than men if you try that on them. If you're kind to a boy he'll do anything in the world for you."

Mr. Simon has had an important part in the company's policy of making the messenger days a training school for the jobs the boys will hold down after they have outgrown the messenger work. The company encourages the boys to attend Y. M. C. A. classes or evening school; to shine their shoes every morning, keep their hair trimmed, and take pride in their general appearance; to "cut out" smoking or chewing.

"You'd be surprised at the psychological effect of a shoe shine." Mr. Simon says. "Some of the boys are pretty sloppy when they first come here, but inside of a few days their whole appearance has spruced up. Personal appearance is an indication of character, and we try to keep the idea before the the boys that character is the big thing for a boy to keep foremost in mind."

Mr. Elston, who is twenty-five years old began work as messenger for the company nine years ago. His first promotion was to a clerkship. Later he was put in charge of the delivery department, and now is night manager at Wichita.

Cleveland Gets Ready for Convention Day

Cleveland is waking up to the fact that it has a Republican national convention on its hands in slightly more than three weeks.

For months the convention workers, have been collecting funds, sending letters, ordering badges, blueprinting the seating plans, arranging trains, getting tickets printed, accepting offers for assistant sergeant-at-arms, and otherwise plugging away.

The city as a whole—except those who contributed to the $125,000 fund—knew little more than that there was to be a convention. Later came the indications that President Coolidge would be nominated without a struggle.

Now the excitement will begin. Coolidge national headquarters has opened; David W. Mulvane, representative of the national committee, is installed behind his desk in the Federal Reserve building; the women's headquarters has outgrown itself and had to be moved, and James L. E. Jappe, secretary, has become the busiest young man on Ohio.

The seventh floor of the Federal Reserve building bears new signs, "Republican National Headquarters," "David W. Mulvane, Arrangements Committee," "John T. Adams, chairman; George B. Lockwood, secretary; Republican National Committee.

The national sub-committee on contests, headed by Senator George Wharton Pepper of Pennsylvania, will meet on June 4. There are four contests among delegations from Mississippi and Georgia, and delegates from North Carolina and Arkansas. But it is not apt to be very exciting. Almost all the delegations are for Coolidge. What they are fighting about is the right to get into the convention. The number of contests is the smallest in years.

Cleveland probably will be more elaborately decorated during the convention week than since the 125th anniversary celebration, in 1921. Virtually every lamppost will be clothed in flags or bunting. Public square probably will be made over with decorative columns and pillars, and searchlights may stream forth there at night.

Public halls probably will have papier mache elephants quartered on its lawn. Inside the hall, the decorations will be simple, consisting principally of a flag or two and a picture of Warren G. Harding. The hall is ornate enough, the committee thinks.

Entertainments may be the most attractive feature by the time the convention assembles, because the business—except choosing a candidate for vice president—will be cut and dried. Golf links, lake steamers, theatres, and the rest will be crowded to capacity.

The women are not planning on being in the background. Already a score of hostesses have been chosen and are organizing.

The convention itself will open Tuesday, June 10, and devote itself to listenng to Congressman Theodore E. Burton, temporary chairman, sound the keynote.

Wednesday probably will be devoted to effecting a permanent organization, adopting the platform and nominating President Coolidge.

The vice presidential nominee will be chosen Thursday, and the convention will attend to a few other matters, and quit.

The Western Union Telegraph Company is installing a large number of duplexes in the main office, a large number of loops to convention hall; also one or more multiplexes to San Francisco to take care of the coast file. Provision is being made for eighty or more operators at convention hall where all press matter will be handled direct. Facilities for handling a million words a day are being made.

WILLIAM H. VAN ZANDT, manager, Albany, N. Y. retired on May 1st on account of ill health after a service of forty-seven years. His successor is A. W. Petersen, assistant manager of the office.

F. G. HAMMOND has been appointed chief operator at Springfield, Mass., vice C. F. Cavanaugh, acting chief operator. Mr. Hammond comes from Charleston, W. Va.

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A Question of Authority

IF the Senate should grapple with the Western Union Telegraph company on a question of contempt growing out of the company's refusal to hand over to the Senate committee investigating the Department of Justice the private telegrams of Harry M. Daugherty, we are likely to get a final judgment as to how far the Senate may go, or where it may not go, in pursuance of its inquiry.

Questions have been raised by competent judges as to the constitutional authority of this Senate committee to go on indefinitely along the course it has mapped out for itself. These are questions that ought to be cleared up once and for all, and in the clearing up of them there should be attention to principal and not at all to the personalities which may be involved in the issues raised.

The Western Union Telegraph company is a big institution traversing the whole land in its activities. It is not interested in the political fortunes or controversies of any individual. Its business is to convey messages from place to place and from person to person. In doing so it properly acts in the capacity of a confidential agency. Its relations to its patrons are in one very important sense analagous to the relations of a physician to his patient or a minister to his parishioner. It deems that the messages it carries are private property and that the company has nothing to do with them beyond transmitting and delivering them. It therefore safeguards them from the public eye unless or until it is commanded by competent authority to bring them into public view.

It questions that the Senate is such competent authority in the instance under consideration. It raises an issue of principal and of public policy, and as we understand it Harry M. Daugherty as a personality has no more to do with that issue than a rabbit has to do with the Einstein theory. The issue is basic, and not partisan. It relates to the best interests of all the people and not to the affairs of one person or a limited group of persons.

Is the Senate exceeding its powers or is it not? Is it setting a precedent inimical to wise public policy or is it not? Answers to these queries concern the whole people, not in terms of a man under fire for alleged betrayal of a public trust, but in terms of the general weal. By all means let's clean house and stick to the tools and methods of cleaning that are sanctioned by the laws of the land.

A. E. Gerhard

THE world's speed record for copying radio telegraph code signals was broken by A. E. Gerhard, an Omaha man, at a contest held at the fourth annual convention of the Second district executive radio council in meeting at the Pennsylvania Hotel recently.

Mr. Gerhard received straight copy at the astounding rate of fifty-nine and one-half words a minute.

He is a brother of F. H. Gerhard at 2714 Jackson Street and was born and raised in Omaha.

After graduating from an Omaha grammar school Gerhard entered the employ of Armour and Company, as an office boy in the order department, and less than twelve months later was given a position working one of the company's leased wires. Still later he was advanced to the "beef" wires operated by the packing houses, which he worked successfully until 1908, when the system was abandoned. It is well known that the packinghouse "beef" wires are the "heaviest" in the country.

Mr. Gerhard then went to work for the Western Union Telegraph Company in Omaha, where he remained for a year, and resigned to take a position in the office of Logan and Bryan, grain brokers.

For four years he handled the grain wire in that office and learned about wireless telegraphy by experimenting with apparatus of his own making.

He then answered the call of the sea, joined the Marconi staff at San Francisco and sailed on the steamship "Beaver." After a year with various vessels he was transferred to the British steamer "Nile," and was with that boat when the European war broke out. He narrowly missed being interned at Hongkong, China.

When the Transpacific circuit opened in 1914 he was appointed night trick operator and has been carrying on the work successfully since that time. He has established an enviable record in operating, never receiving "valentines" for incorrect transmission or reception on either the wireless or the land wire circuits. He has also been known to copy messages from Kahuka for several hours at a stretch through static without even a break.

During his spare time he took up a course in electrical engineering and has nearly completed the work. In December, 1914, he passed the government test for "extra first-grade" license with a percentage of 95 per cent.

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CONTENTS

PAGE

Caustic Soda Primary Cells in Railroad Telephone Service. By Worth Rogers. 268

What Hath God Wrought 269

Do Wireless Waves Bend? 270

Western Union Telegraph Company Prize Competition 271

The Fastidious Mr. Johnson. By Robert Ellis 273

Squier's New Wire Code is 2.56 Times as Speedy as Morse. Wireless Telephony. Cape Town Radio Station 276

Operation of Regenerative Receivers. By A. K. Phillipi 277

Transmits 1000 Words a Minute. Telegraph and Telephone Life Insurance Association. Wireless War on Crime 278

Radio Corporation of America. Obituary. Warren Y. Soper 279

Editorial Comment—Telegraph Auxiliaries. Joseph Henry in the Hall of Fame. 280

The Railroad-Telegraph and Telephone Section of the American Railway Association. Promoted. Coming Conventions 283

The Application of Radio Engineering Principles to Submarine Telegraph Cables. By Major General George O. Squier. (Continued from page 245, June 1st Issue.) 284

Candler System. Great Northern Telegraph 286

Personal. Postal Telegraph-Cable Company. Commercial Pacific Cable Company. Old Time Telegraphers' and Historical Association. Liquor Ships and Cables 287

Western Union Telegraph Company 288

A Telegrapher When Conference is On. Nevada, where one in every 150 is in State University. 289

Telegraphers Strike 290

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Caustic Soda Primary Cells in Railroad Telephone Service

By Worth Rogers,
Telegraph and Telephone Engineer, Missouri Pacific Railroad Co. St. Louis, Mo.

Committee No. 2, Inside Plant—Construction and Maintenance of the Telegraph and Telephone Section of the American Railway Association has recently had passed, for inclusion in the Manual, a Specification for the Installation and Maintenance of Caustic Soda Batteries, which should prove useful and instructive to the Telegraph Departments of railroads. The specification deals strictly with installation and maintenance and does not attempt to point out the services to which this type of primary cell is particularly adapted. One of these services is the supply of current for telephone transmitters.

The problem of furnishing a suitable and efficient current supply for transmitters in railway telephone service is different from that in commercial telephone service. In railway service, the telephone sets are scattered over a wide territory and, except in large terminals, it is impracticable to make use of the common battery system. Except in a small percentage of cases, transmitter current supply in railroad telephone service must be from some type of primary cell.

The conditions are such that many factors must be considered in making a choice. Some of these factors are:

Dependability of source of supply, i. e., it must not cease to function abruptly, even for extremely short periods;

Suitability to the apparatus with which it is to be used. For example, with the low resistance transmitter commonly used in telephone dispatching and similar service, the cell must have a low internal resistance;

Ability to deliver the required current continuously over long periods. For example, the dispatcher's transmitter may be in almost continuous use for several hours at a time;

First cost; and,

Maintenance cost.

In addition, the cell must be of a type which can be located and maintained in offices without producing fumes or dirt or causing a messy condition when renewals are made. In other words, the cell must be clean.

Of the many types of primary cells available, only two are generally used in railway telephone work. These are the dry cell and the caustic soda cell. Of the two types, it may be said that the caustic soda cell will meet all of the operating requirements. The dry cell will meet all of the operating requirements, except that of ability to deliver energy continuously over long periods.

Of the factors to be considered in choosing a cell for railway telephone service, perhaps the one deserving of most consideration aside from the operating requirements, is the cost of maintenance. And the element in this most likely to be overlooked is labor. At first glance, it would seem that the renewal and maintenance of caustic soda cells involves more labor than does the maintenance of dry cells. If, however, the processes of maintenance in both cases are analyzed, this may be found not to be the case. It is customary, and I believe this is the result of experience, to require telephone batteries to be tested and renewed, when necessary, by a telephone maintainer or lineman. It has not been found, so far as I know, good practice to issue renewal supplies of either dry cells or caustic soda cells to the telegraph or telephone operators or others who use the telephone. One reason for this is that those persons are prone to suspect "weak batteries" as the cause of any trouble which may develop, resulting in waste. A large part of the maintainer's time is spent in traveling, going from station to station testing and renewing batteries. The time thus spent is undoubtedly much greater than the time spent in actual maintenance work. Obviously, if the traveling time can be cut down, the number of men required to maintain a given amount of plant can be reduced. Caustic soda cells may be obtained in 200 to 1000 ampere-hour sizes, and, once properly installed in service, require no attention until their useful life is ended. They do not deteriorate noticeably when not in use and, therefore, their useful life is practically directly proportional to the use made of the telephone transmitter with which they are associated. There is no deterioration of renewals held in stock for maintenance.

While there may be justifiable difference of opinion as to the desirability of using caustic soda cells for certain classes of railway telephone transmitter current supply, the writer's experience indicates that there is no question of their economy in the following cases:

On dispatcher's transmitters;

On message circuit monitor's transmitters;

On transmitters located at busy offices, such as yard telegraph and terminal telegraph offices;

On transmitters located at points distant from a maintainer's headquarters, where considerable traveling is required for maintainer to reach such points.

The voltage of a caustic soda cell is lower than that of a dry cell. A rather loose, but satisfactory rule governing the number of cells to be used on dispatching and similar railroad telephone circuits equipped with low resistance transmitters is as follows:

At dispatchers' offices on lines less than one hundred miles long, 4 cells; more than one hundred and less than two hundred miles, 5 cells; more than two hundred miles, 6 cells.

In using the Specification for Installation and Maintenance of Caustic Soda Batteries referred to the wiring to the telephone transmitter should be in accordance with paragraph F-4 of Telegraph and Telephone Section Specification for the Installation of Telegraph and Telephone Equipment in Railroad Offices.

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What Hath God Wrought

On the 27th of April, the anniversary of the birth of Professor S. F. B. Morse, upon the invitation of the Fraternity at Richmond, Va., the Rev. C. L. King, D.D., of Grace-Covenant Presbyterian Church, Richmond, Va., preached a sermon on "What Hath God Wrought." He said:

"I desire to extend to you, our guests, a cordial welcome. I am delighted to have such a body of fellow workers in this church, for I want the people of Richmond to know you better and have called to their minds the important place you occupy in our complex civilization.

I doubt if people generally have anything like an adequate conception of the size of the army to which you belong. If the telegraph and telephone operators and office men and women, linemen and messengers, and a host of others connected with these professions, and then the multitude working along lines closely akin to yours were to be brought together, I doubt if there is a building in Richmond that would house such a gathering. The people of your profession cannot be brought together. We can conceive of a gathering of ministers in which every minister of the city would be present. Such a gathering would be possible for doctors, for lawyers, for merchants, for builders, for clerks, and for the various other callings; but think of the paralysis to business and industry and life in general if every person connected with your work should leave even for a couple of hours to attend a meeting. Your work must go on by day and night, in season and out of season, fair weather and foul. A church officer belonging to your profession tells me he has often paid three or four dollars to some one to relieve him while he attended a meeting of the church officers.

In emphasizing the size of the army to which you belong I should point out that the Western Union Telegraph Company has an office for every 5,000 people in the United States. If the people of the United States were divided into groups of 1,700 there are sufficient Western Union employees to furnish one to a group. The system has enough wire to encircle the globe sixty times, and over these wires there goes messages equivalent to one a year for every man, woman and child in the United States.

However, it is not the vastness of the army to which you belong that I would impress upon your friends, but the all-important place you occupy in our civilization. You control the ships that plow the sea. The trains of the continent are started and stopped by your commands. The accounts of political decisions which make and unmake governments pass first through your hands. Only a few days ago, the Western Union handled the longest message ever sent without relay. The report of the Dawes' Committee, consisting of over 40,000 words, was sent direct from Paris at the rate of fifty words a minute. The fortunes of men are made and lost by messages that you handle. Without you business would be paralyzed. You give us our morning and evening papers, and we call upon you to decide whether we are on time or late for an engagement. You are friends in joy and sorrow. When a new life comes into the home we ask you to tell grandparents, brothers and sisters, uncles and aunts, and relations that were never before acknowledged. Yes, and when the angel of sorrow makes a sudden visit to our homes, we turn to you and ask that you will tell loved ones in distant lands. And in a few hours you are bringing us messages of sympathy and love. You are very close to the world's joys, and no one knows better than you of its tragedies and sorrows.

The occasion that brings you together in this church tonight is the 133rd anniversary of the birth of the father of your profession, S. F. B. Morse. On this very day of the month, the 27th day of April, 1791, in Charlestown, Mass., the father of telegraphy, and, in reality the father of many kindred sciences was born. I want to congratulate you on your sense of the eternal fitness of things as shown in the way you have chosen to celebrate the birth of the inventor of the telegraph. It is well that you have come to a church for such a celebration, for the religious background of telegraphy is too prominent to be neglected. Morse belonged to a people that believed in the sovereignty of Almighty God, and that his eternal purposes embraced events both small and great in the whole creation.

Historians tell us that to Rev. Jedediah Morse, D. D., father of the inventor, more than to any other man in his day may be attributed the impulses given to religion and learning in the United States. Jedediah Morse got his theology largely from Jonathan Edwards, a greater mind America has never produced. To his scholarly divine, Jedediah Morse, belongs part of the honor of the founding of such institutions as Andover Theological Seminary, the American Bible Society, and the American Board of Foreign Missions.

I must also refer to that woman of God, Elizabeth Ann Breese Morse, the mother of the inventor, and the granddaughter of Dr. Samuel Finley, President of Princeton College. It was said of her that she was distinguished for possessing in an eminent degree, both the fascination and the virtues which most adorn a woman.

I have referred to the father and mother of Morse in order that you may understand that he was from a religious household, a home where God's will was supreme and God's purpose all embracing and God's mercy manifested in every gift that blesses mankind. His father and mother verily believed that the invention from the mind of their son Finley was a gift from God. Who today does not believe that telegraphy and all the other kindred sciences are gifts of the God who yet has marvelous revelations in store for His people?

But in speaking of the religious background of telegraphy I must not confine my remarks to the father and mother of the inventor. Morse himself was a deeply religious man. He too held a conception of God that has characterized many of the

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greatest men in history. The following quotation is from the letter of a dear friend to Morse, upon learning of his approaching wedding. It contains advice that men would do well to heed:

"Take care to ascertain before the knot is tied whether she has a deep sense of true religion. Do not on any account marry unless you are satisfied that she has, and be not contented with a mere outward profession; she must delight in it. Her religion must be practical, or she will not make the kind of wife I should wish a friend to have."

The abiding faith of Morse himself is illustrated in a letter to his prospective bride. He is speaking of certain inventions which he hopes the Government will accept, and he writes, "All is in God's hands; in His own time and His own way, all things shall work for good to us if we love him." Upon learning of the death of his beloved wife, he writes his father, "I need your prayers, and those of Christian friends to God for support."

I want to refer not only to the religious background of telegraphy as found in the inventor and his noble parents, but I also remind you that the telegraph was christened with a message, giving the praise to God. Eighty years ago this next month the first message was sent. The message was "What hath God wrought!", and was sent by Morse himself from Washington to Baltimore. The historian tells us that these words were chosen by the lady to whom the honor was given because she had often heard the words from the lips of Morse. "She knew that he would appreciate the propriety of ascribing the honor of this wonderful invention to Him whose lightning shineth out of the east, even into the west, and whose words have gone out through all the earth."

I remind you that the cable from shore to shore was christened with the message from the lips of the angels, "Glory to God in the highest, on earth peace, good will toward men." I remind you that the last message of the genius, the name of God, Morse, was: "Greeting and thanks to the telegraph fraternity throughout the world, 'Glory to God in the highest, on earth peace, good will toward men.'"

With such a background as this, am I drawing on my imagination when I speak of your science as a gift of God? It came from a mind that was ever toward God. It was carried through to success by faith in God. It was bathed in prayer and tears. It was offered to the world as a tribute to God.

Morse was a many sided genius. It is not known by the public that he was long an inventor before he invented the telegraph. It is not generally known that he gave the best years of his life to the study of painting. In the courthouse at Charleston, S. C., there hangs a painting of President Monroe, which is from the brush of Morse.

The struggles through which this man passed ere his work were crowned with success and were sufficient to have defeated a number of less brave souls. He knew the meaning of poverty, of blasted hopes, of overwhelming sorrow. "He endured as seeing Him who is invisible."

Members of the Association of Telegraph Operators, and those of kindred professions, you have a great heritage. You are called upon by this heritage to a constant renewal of your devotion to the high ideals which were in the hearts of those who have gone before."

Do Wireless Waves Bend?

DR. PALMER at his Presidential address to the recently formed Manchester, England, Radio Society took for his subject:—

"The propagation of electro-magnetic waves over the earth's surface." "Incidentally he suggested that the Society's members should make a serious attempt to investigate some of the simpler problems within the scope of the holder of a transmitting license.

The main part of Dr. Palmer's address was a consideration of the mechanism by which electro-magnetic or wireless waves are propagated. The nature of this mechanism, he said, was at present an unknown quantity; we did not understand how the waves travelled. It was at an earlier time assumed by the theorists that they travelled in all directions, like light. If that were so, any world-wide wireless telegraphy or telephony would be impossible on account of the rapid dissipation of the energy in all directions. Marconi, without knowing of this theory, attempted to do what to the scientists had appeared an absurdity—and found that it worked.

The theorists, accordingly, had had to devise some other mechanism to account for the propagation of wireless energy. With that object they introduced such conceptions as that of the "Heaviside layer," a hypothetical stratum of ionized air capable of reflecting wireless waves and preventing them from spreading upwards into space.

The most recent experiments carried out by the British navy indicated a possibility, however, that this theory was not sound, and, further, that the whole problem might depend upon the bending of wireless waves around the earth in the same way as light waves were known to be bent by diffraction.

Dr. Palmer went on to suggest that the future possibilities of wireless transmission would probably be concerned with either the production of a continuous wireless wave, encircling the earth and carrying any messages which might be required to be sent from one point to another, or the direct propagation by a beam like the beam from a lighthouse.

He mentioned that it was already a practicable proposition for two persons, with two pairs of telephones but only one aerial, to receive independently and simultaneously from any two stations that happened to be transmitting. Thus, with the one aerial and one receiving circuit to which two telephones were attached, one person might be listening to Paris time signals on 2,600 metres and the other to ships signals at 600 metres.

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The Western Union Telegraph Company.
Prize Competition

TO THE EMPLOYEES:

ANNOUNCEMENT—1. In collaboration with the Association of Western Union Employees, the following plan for a Prize Competition has been adopted, with a view to improving and developing the service, reducing operating costs, and promoting cooperation.

AWARDS—2. Five thousand dollars ($5000) shall be awarded for practical and original suggestions, as follows:

First prize of $500. Second prizes of $250 each. Third prizes of $100 each. Fourth prizes of $50 each. Fifth prizes of $25 each.

3. A further five thousand dollars ($5000), or so much thereof as may be warranted, in the discretion of the Central Competition Committee, hereinafter described, may be distributed as additional awards, dependent upon the merit of the suggestions submitted, and their number.

TIME LIMIT—4. The Competition shall open June 2, 1924, and close September 2, 1924.

EMPLOYEES ELIGIBLE TO COMPETE.—5. All employees of the Land Line and Cable Systems in active service, except officers of the Company and General and Division Department Heads are eligible to compete.

SCOPE AND NATURE OF SUGGESTIONS—6. The following is indicative of the objects toward which suggestions should be directed, although ideas on any other subject pertaining to the Company's operation may be submitted.

a. Improvement in service rendered the public. b. Development of new business. c. Development of additional sources of revenue, through more intensive utilization of facilities and organization. d. Improvement in traffic operating methods. e. Reduction in costs. f. Elimination of waste. g. Improvement in design of plant or equipment. h. Improvement in construction and maintenance methods. i. Improvement in conditions affecting health, safety and comfort of employees and public. j. Simplification of records through elimination of duplicate or unnecessary reports, or improvement in systems and forms. k. Promotion of cooperative relations between employees and the Company. l. Promotion of cooperation between employees and between departments.

7. An employee of any department may offer a suggestion pertaining to his own or any other department.

SUBMISSION OF SUGGESTIONS 8. Suggestions shall be in memorandum form, on one side of sheet of plain white paper, 8½ x 11, preferably typewritten in ink otherwise legibly written in ink. They shall be brief and to the point, preferably not more than two pages in length, but should contain sufficient details to describe the author's idea, and, when necessary, should be accompanied by sketches or plans. Obviously, unduly long or wordy memoranda cannot be given as much consideration as ideas clearly and concisely expressed. A carbon copy of the memorandum shall be retained by the author for the purpose of verification. To insure impartial consideration, the memorandum and accompanying sketches, if any, shall not be signed, nor contain any identifying marks.

9. A sealed blank envelope, enclosing a memorandum containing the name, address, position and office location of the writer, shall be attached to the unsigned suggestion, and both shall then be enclosed in another envelope and mailed to—

The Western Union Telegraph Company, ———* Divisional Competition Committee, (Street), (City and State.)

10. Suggestions to be considered must reach the Divisional Competition Committee not later 5 P. M., Standard Time, September 2, 1924.

11. Suggestions will not be acknowledged nor returned to the authors, and it is expressly understood that in submittng them, under this plan, the senders authorize the Western Union to reject or make use of them, without liability of any kind.

12. An employee may submit any number of suggestions, but each shall be on a separate memorandum enclosed separately as provided in Paragraph 9. Since award will be based on the merit of individual suggestions, an employee may win any number of awards.

DIVISIONAL COMPETITION COMMITTEES—13. The following Divisional Competition Committees shall be created to receive, review and grade all suggestions:

Committee—For each division of the Land Line System, except the Metropolitan, Northern and Ohio. *Personal*—General Manager, Division Traffic Supt., Division Plant Supt., Division Auditor, Division Vice-President A. W. U. E.

For Metropolitan Division—Commercial General Supt., Division Traffic Supt., Division Auditor's representative, Metropolitan Plant Supt., Division Vice-President A. W. U. E.

For Cable System—American Division.—U. S. Cable Manager, American Traffic Manager, General Plant Manager, Assistant Auditor—Cable System, Representative W. U. C. E. A—American Division.

For Cable System—European Division.—European General Manager, European Traffic Manager, Asst. General Plant Manager, Accountant, Representative W. U. C. E. A.—European Division.

For Headquarters Employees at New York.—One representative each of Plant, Traffic, Commercial, Engineering and Accounting Departments to be appointed by the respective Vice-Presidents; one representative to be appointed by the President of A. W. U. E.

14. Each Committee shall appoint one of its members to act as Secretary. The Committeeman shall

*Insert name of Division, such as Eastern, Metropolitan, Headquarters, American Cable, etc.

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be free to consult their respective staffs in determining the practical worth of suggestions offered.

CENTRAL COMPETITION COMMITTEE.—15. A Central Competition Committee, composed of the Vice-Presidents in charge of the Plant, Traffic Commercial, Engineering and Accounting Departments, the Assistant to the President, who shall act as Chairman, and the President of the Association of Western Union Employees, shall be established for the final review of suggestions deemed worthy of consideration by the Divisional Committees, and for the final awarding of prizes. This Committee may appoint a Secretary.

REVIEW BY DIVISIONAL COMMITTEES—16. The Divisional Committee's Secretary shall receive all suggestions and immediately stamp upon the suggestion memorandum the date and time (Standard) of receipt. The envelope in which the suggestion is received shall be destroyed to prevent identification. Before the sealed envelope containing the name and address of the author has been detached from the anonymous suggestion, each shall be stamped with the same identifying number and with the name of the division or a representative symbol, such as "G" for the Gulf Division.

17. The suggestions and the sealed envelopes shall be filed in separate locked boxes or in whatever other manner would provide equal secrecy; these files shall be kept in a vault or safe. None but the Secretary shall have access to the suggestions or sealed envelopes until after the time limit expires, *i. e.*, September 2, 1924, when the suggestions only shall be handed to the Divisional Committee, the Secretary retaining the sealed envelopes under lock and key.

18. The Divisional Committee shall review all suggestions and select and forward to the Central Committee all that have merit. In case a valuable suggestion is solely of local application, a memorandum signed by all members of the Committee and clearly explaining its local value shall be appended.

19. Suggestions, to qualify for consideration, must in the judgment of the Committee, be original to the extent that substantially the same idea has not already been adopted or is not in the process of development by the Company. Original and feasible suggestions, the worth of which may not be susceptible of monetary measurement, should, nevertheless be given due weight. Penmanship, so long as it is legible, spelling and composition will not count in influencing the award.

20. A statement, to be signed by all members of the Committee, shall be prepared, giving the number and a brief synopsis of each suggestion of merit, arranged in order of grade.

21. The above certified statement, together with all the meritorious suggestions and corresponding sealed envelopes, shall be forwarded to the Chairman of the Central Competition Committee in time to reach him not later than September 27, 1924.

REVIEW BY CENTRAL COMMITTEE—22. The Chairman shall immediately present to the Central Committee all the anonymous suggestions, but he shall retain the sealed envelopes under lock and key until the Committee has made its awards.

23. The Central Committee shall review the selected meritorious suggestions, and grade them according to their practical worth on a common standard, and shall award the specific prizes hereinbefore stipulated. In the event of similar prize-winning suggestions by two or more competitors, the award shall be apportioned among them. If the merit of the suggestions so warrants, the Committee may, at its discretion, award additional prizes, not exceeding $500 in the aggregate. The Central Committee shall then forward to the President a certified report of the prize-winning suggestions, listing them by numbers and stating the awards.

ANNOUNCEMENT OF AWARDS—24. After forwarding the above report to the President, and not until then, the sealed envelopes shall be opened, the successful contestants' eligibility verified, and a certified list of the names, addresses and positions of qualifying successful contestants shall immediately be reported to the President. If any successful contestant should be found ineligible to compete, the prize shall lapse, unless it should be the First Prize, in which event, an additional award of $250 shall be made for the next best suggestion.

25. On or about November 1, 1924, the Central Committee shall announce the awards by circular to all offices, and shall arrange for such other publication of the awards and the suggestions as it may deem proper.

26. The successful contestants shall be notified individually by letter accompanied by check for the award.

27. The decision of the Central Committee in all matters of procedure, dispute and award shall be final.

DISPOSITION OF SUGGESTIONS.—28. After announcement of the awards, the suggestions shall be distributed among the departments for such action as may be warranted. The sealed envelopes containing the names of contestants shall be held until February 1, 1925, and then destroyed.

NEWCOMB CARLTON
President.

New York, June 2, 1924.

ADDRESSES OF DIVISIONAL COMMITTEES

Eastern, 195 Broadway, New York City; Southern, 713 Transportation Bldg., Forsythe and Marietta Sts., Atlanta, Ga.; Lake, 427 South La Salle St., Chicago, Ill.; Central, Woodmen of World Bldg., Omaha, Neb.; Gulf, Corner Main and Pearl Sts., Dallas, Texas; Mountain, 605 Railway Exchange Bldg., Denver, Colo.; Pacific, 49 Geary St., San Francisco, Calif.; American Cable, 40 Broad St., New York City; European Cable, 22 Great Winchester St., London, E. C. 2, England; Metropolitan, 195 Broadway, New York City; Headquarters, 195 Broadway, New York City.

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THE FASTIDIOUS MR. JOHNSON

By Robert Ellis.

Sam Johnson, Western Union Foreman, performing minor repair work on the Wyoming Division of the Erie Railroad, which work consisted mainly of resetting the line, was disturbed—visibly disturbed and his erratic behavior at Mample Center was anything but encouraging to his gang of linemen. His nervousness for the past half-hour boded ill for the gang.

With his grimy corncob pipe thrust vise-tight between his strong teeth belching forth volumes of acrid smoke, he paced up and down the long platform of the railroad station as one possessed. He was muttering to himself at every advance, his misty blue eyes focussed downwards beneath the flapping vigor of his worn and tattered cap, seemingly oblivious of the gaping throng assembled around him. His actions, to say the least, were disconcerting and an enigma to his men, as was plainly portrayed by the puzzled expressions on their tanned and weather-beaten countenances. This steady pacing grated on their otherwise steady nerves and it was with genuine relief, they saw him abruptly desist.

"Johnson is going looney" was the unanimous opinion of the gang and when big Frank McKenna turning around to his mates remarked "He's got a screw loose somewhere," the gang nodded their heads in agreement.

"Yes," added Shorty Harrison, expectorating in the general direction of the iron cuspidor, "I have been climbing for that old bird for many years now and I have never seen him so bughouse before."

If the gang could penetrate Johnson's mind just then they would be a much surprised bunch of liners. They had no inkling of what was traveling in his mind. Before that night was over both climbers and ground men would learn something—a sort of corrective or disciplinary measure Johnson was going to promulgate in the matter of fashions. In other words, a dress reform would be inaugurated among the men.

Further derogatory remarks on the part of the nonplussed gang were suddenly interrupted when a locomotive slowly backed its way alongside the station and was instantly coupled to the local train which would convey Johnson and his men to the work which they were engaged upon east of Hawley. With accustomed promptness the men followed closely on the heels of their foreman into the smoking car. As this train was made up at the station, the men had little trouble in securing seats and cluttering the space between their feet with their climbing hooks and small pulley blocks, they lounged contentedly on the cushioned seats, smoking placidly and, of course, the predominant subject of their discourse was what was troubling Johnson.

Immediately after the train of cars had acquired speed pulling out of the yard, Foreman Johnson and Ted Cook, his assistant or Straw Boss as he is termed in the line gangs, were engaged in an animated conversation. At the onset it was one-sided, however, as Johnson elected to do the major part of the talking, emphasizing his remarks by sundry gestures while Ted Cook lent a receptive ear but seldom deigning a reply. If Cook thought his superior crazy at the station, he was sure of it now as Johnson planned out such an unheard of reformation in a telegraph gang.

"Look here, Cook, we are getting to be a darn lot of hoboes. Look at me—regular General Coxey and then some. Well—things are going to be a lot different for, starting tomorow or the next day, the gang in this outfit is going in for sport clothes or my name isn't Sam Johnson. Watch my smoke tomorrow." Eliciting no response from his disgusted assistant, Johnson again turned to the window and scrutinized anew the old four wire line which they were at present working on.

"Sam," pipes out Cook, turning around and looking into the unshaved sour visage of Johnson, "I have been thinking of that damn fool scheme of yours right along and I think it's punk. Why, h'l man," he went on, raising his voice, "your work would be shot to pieces if you start the men wearing starched chokers and patent leather kickers. They'll quit fast."

Johnson jerked up suddenly in his seat at the challenging note in his assistant's voice and retorted in kind: "They either doll up on this job or quit and be damned. I'll give them their orders tonight myself." With this parting shot Johnson's angry countenance again scanned the swiftly moving panorama outside the car window.

"Well, you're hunting trouble, that's all I can say," was the somewhat belated shot hurled by Cook into the ears of his superior. Johnson gave no indication that he heard Cook's last warning remarks as the train went on thunderingly to its destination.

The work that afternoon progressed swiftly—ideal weather and good digging conditions—and the daily work report which Johnson forwarded to the general office at New York put the general foreman in exceptionally good humor. "There will be a comeback tomorrow sure," thought Straw-boss Cook, "if these fang-dangled ideas of this nutty foreman are carried out."

That night after the men had eaten substantially of the generous fare at Crane's Boarding House and were enjoying a much needed rest on the comfortable seats on the spacious porch of the rooming house, Foreman Johnson suddenly appeared in their midst which ended their desultory conversation for the time being. If an apparition had appeared to them on the darkened porch they would not have been more startled, for it was contrary to Johnson's practice to mingle with his men after working hours. In explanation of this he said he had a

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few words to say to them and would not take too much of their time. "Boys," he launchd out in a conciliatory tone, "Don't you think it is about time to can them old working duds of yours and garb yourselves in clothes more ornamental. The farmers around here could use these bedraggled raiments of ours to adorn their scarecrows—and by the Jumping Grass hoppers, you've got to do it and uphold our dignity." Johnson paused here to allow his words to seep into their system but outside of a general scraping of chair legs on the rough flooring of the porch, not an individual in the gang deemed it wise to vouchsafe a reply. They expected further explanation from Johnson. After a comfortable interval Johnson continued more forcibly: "And by cracky, the one who doesn't dress to suit me, he is going to get his time. That's all, gentlemen," he dramatically concluded. After delivering this ultimatum, he slipped off the porch and disappeared down the grass-fringed flagged walk.

"Well boys," whispered lanky Hank, knocking the dottle out of his pipe against the porch rail, "the old boy has gone loco. Who in hades is going to furnish us with the glad rags and how in the devil are we going to work in them?"

"Well, if the company provides them, I am Johnny on the spot," snapped up Tommy Lloyd, who was considered a connoisseur on fine tailoring and haberdashery and aspired to be the Beau Brummel of the gang.

"Cut that monkey chatter out," interrupted Gerald Hawley. "Johnson had a darn fool pipe dream last night. Wait until tomorrow and see if he will doll up on the job himself as he said."

The night passed none too quickly for the gang as they were impatient to see Johnson in his new duds. As they caught sight of him entering the dining room the next morning while they were at the breakfast table, they stopped eating abruptly. They hardly recognized the rejuvenated Johnson. Heretofore, in season and out of season, his coarse reddened face was a stranger to a barber's touch. This morning his flaming features shone with an unusual lustre and his long figure was attired in a neat blue serge suit which fitted him closely. Prior to this change, a hand-me-down one was his simple adornment. In place of a faded blue flannel shirt, he was wearing a magnificent multicolored silk shirt and a pair of Douglas kickers and O'Sullivan's heels protected his calloused feet, and in his hand he carried gingerly a velour hat. Plain Sam Johnson had become His Nibs, the Nabob—a King for a day.

The gang was amazed at his changed appearance and during the rest of the meal were hardly able to eat enough to sustain a canary bird. Johnson himself ate sparingly for he was the cynosure of all eyes and this new situation troubled him.

Immediately after their frugal breakfast the gang proceeded to the railroad station. On their journey the clear morning air was being split by their uproarious laughter for fatty Johnny Hines had conceived a very ingenious plan to put a damper on Johnson's new make-up. Between loud guffaws he was explaining the lot to his mates.

"He'll never come back as he went out, so help me," laughed Hines, as the gang stepped off the road into the railroad platform.

The foreman was pleased with himself that morning on his trim appearance although uncomfortable and considered himself as well dressed as his superior executives. What worried him most was the furtive glances of his men and their smirking countenances as they equipped with bar, shovel and scoop were industriously digging holes for some new poles he expected to set that day. As the holes were going down with incredible speed, he could afford to overlook any marks of disrespect on the part of the men and, furthermore, he commented to himself, "We'll be birds of a feather tomorrow."

Late that afternoon, the holes being down the required depth, Johnson made ready to throw the poles that were on the ground in. Summoning his men, the entire gang surrounded the top of the pole and raised it up until Scrappy McTigue was able to prop up the deadman against it. Releasing their arms from the leaning timber the gang secured their slim pike poles and digging the spikes firmly into the top of the pole they thrust it in the hole prepared for it. At the butt end of the pole, Foreman Johnson, his toughened hands encased in a pair of suede gloves, had steered the pole in with the aid of a pair of cant-hooks. Before quitting time all the new poles were set, filled in partially and a new fir arm adorned its roofed top. The transferring of the four No. 8 iron wires from the rotting black arm on the original line was speedily accomplished by the experienced linemen. With the new line of poles in place the men provided with chopping axes cut down the old poles stripped of their appendages.

"Well, Johnny Hines," spoke up Johnson in a genial tone a few minutes later, "how about you and Shorty Harrison there," indicating with a nod of his head, the runt in his gang, "char and spray these new poles."

Not loath by any means but eagerly anticipating the work, Hines and Shorty had their char and spray tanks ready in short order. They were ready not only to spray the poles but spray the Boss also. Shorty, an experienced torch man, was assigned to do the charring while Hines, instigator of the plot to humiliate Johnson, elected to creosote the poles. As this was a new operation Johnson paid close attention to the impregnation process and hovered very close to his two men, while they charred and sprayed the poles to his undoing later on.

The last pole but one proved to be Johnson's Waterloo. Shorty had just charred this pole and was off to the next pole when Johnny Hines came laboring along a few seconds later with his tank grasped firmly in his left hand and the metallic hose and sprayer in his right hand, trampling through the tangling underbrush. When within a

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few feet from the pole he was to creosote, he feigned a stumble and sprawled headlong on his face, but his deft fingers managed to release the valve on his sprayer which opened up wide releasing a warm spray of dead oil of coal tar which deluged his Boss from his Dunlap's skypiece to his Douglas kickers, completely ruining his new wardrobe beyond repair. For several minutes the air in that vicinity was electrified by blood-curdling oaths which Johnson was heaping on the head of the culprit. Hines with his head averted, the peak of his cloth cap veiling his eyes, was trying heroically to suppress from bursting out into hilarious joy. The trick had worked on the unsuspecting Johnson but to ward off suspicion, Hines was making weak apologies to Johnson for his tumble, but this irate foreman would not be appeased by mere apology. He wanted Hines' blood. Fortunately for Hines, Johnson was temporarily blinded by the fine mist of the oil and he eluded a mule-like kick projected from Johnson's number 10 shoe and he sped up to rejoin his work mates further up the line. When the gang learned from Hines what happened to Johnson they were as happy as schoolboys out on a lark and went at their work with unusual zest and with brighter spirits the balance of the day.

Recovering somewhat from the effects of his creosote bath, Johnson hatened to his assistant Cook and glowered at him menacedly as if he was to blame for the mishap. Cook could not keep from smiling at his Boss's ludicrous appearance but half-blinded Johnson could not detect the smirking countenance of his assistant.

"Where in h—l is that red-headed fat lobster Hines," he blurted out. "If you see him tell him for me the region around here is too darn small for him and me to occupy together." Tears of mortification creased his cheeks as he told Cook of the dastardly trick perpetrated by the rascally Hines. After confiding his troubles to his aide, he turned slowly around and strode off in the direction of the railroad station in a belligerent mood.

That evening at the Boarding House the entire gang with the exception of Fatty Hines were closeted in their rooms rummaging around in quest of spare new duds. They intended to outshine Solomon tomorrow. As for Johnson that day's happening was too much for his sensitive nature and he was quaffing vitrolic hootch in a nearby hootch hostelry.

The following morning at the usual hour before train time, the gang were again assembled at the railroad station waiting for Johnson. This time they were in their glad regalia. What Johnson beheld after he turned the corner of the frame building which served as a station, bewildered him. He had hoped that the gang would not take him at his word in the matter of clothes, for after his despicable experience of the day before, he was through with darn fool notions. He was peeved—very much peeved—when he saw their changed appearance, which boded ill for the organization.

In an hour they were once more traveling down the winding roadway towards the place they had left off the night previous, Johnson preceding them lost in deep thought and in a solemn mood. If Johnson could have heard the chuckling of the overdressed linemen behind him or knew the contents of a certain package one of the men was carrying causing all this hilarity on the part of the gang, he would have been fraught with anxiety for Shorty Harrison was carrying concealed a small camera, and this same picture-taking machine later caused him a month's dismissal.

Arriving at the place where they would resume the day's work, Johnson in his usual blustering manner ordered the gang to their different tasks, but before dismissing them said: "Boys, you do me proud—a better looking lot of bank clerks I have never seen, but by the crawling rattler in that brush, remember you are not checking drafts but digging holes. "Ted Cook, approaching to take direct charge of the men, he retraced his way to the railroad station. The Straw-Boss was convinced there would be very little work accomplished that day.

When Johnson had disappeared, the men instead of applying themselves to the matter of shoveling dirt had grouped themselves around Shorty Harrison who with camera in hand was busily lining up the men against a pile of railroad ties to have their picture taken. Satisfied that he had an excellent photo of the men, Shorty rewrapped the camera and shoved it under the ties and remarked gleefully, "Now when the big Chief gets that picture Johnson will get his." The gang did not feel disposed to labor that morning.

It was fully two hours before Johnson returned and he expected the gang would show some tangible results in this time but as far as his trained eyes could perceive practically nothing was done. One of his men he observed was setting on a stump of a tree with his silk handkerchief underneath him, shining with a piece of chamois a digging bar which shone like polished steel. Another one of his huskies who sported a pair of patent leather shoes was polishing them off with a piece of cotton waste. Joe Sterzh, his newest grunt, was engaged in carving his initials on the handle of his digging shovel, while the rest of them if they were not actually prinking themselves were nonchalantly flicking the ashes from their cigars. It was a gala day for them.

"What in thunder is this," bellowed out Johnson to them. "I am not paying you to look pretty. Pretty is as pretty does. Get at them tools, damn quick."

"You can't expect us gentlemen to soil our hands on these dirty tools, can you?" angrily replied Hardy Corley, who took out in a spirit of bravado, a miniature looking glass and combed his luxurious blonde locks.

"Another thing," blurts out Harry Rose, "that ground is too wet and I don't want to spoil my boots," as he deftly rolled a cigarette.

"I can't climb in these spurs with my new trousers. It will take the crease out of them," added Bill McGrail, as he ran his hand over the

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knife-like edge of his tweeds.

"I don't give a tinker's damn," shouts out Johnson. "You dig and climb or you dig out of here. My suit was spoiled and yours ain't any better than mine."

With reluctance the men went to their work after this severe reprimand. They went half-heartedly and at the end of the day there was not much to show for it except a heavy drain on the payroll. Johnson was discouraged and he could kick himself for trying to start Paris fashions in a telegraph gang.

A few days later at the General Office in New York General Foreman Perkins was examining in admiration a photograph that was sent him by Dick Harrison, one of the members of Johnson's gang. Calling his Chief Clerk Reis over to him and showing him the picture, he proudly exclaimed: "This is a nice bunch of men. Taken Sunday, of course."

"Sunday h—l," answered Reis. "See what Harrison wrote on the bottom of the picture, 'taken Monday, July 6th.'"

Dropping the picture as if it was a red hot coal, Perkins thrust his hand quickly into the top drawer of his desk and drew forth a yellow printed form. He had picked out Johnson's daily work report for Monday, July 6th. "H'm h'm,," Perkins greeted, drawing a massive hand through his hair. "Johnson says in the report, no work done today, rain." He's a confounded liar, they couldn't take that picture in the rain."

Turning around to Reis he says, "John (give Johnson a 30-day layoff."

Squier's New Wire Code is 2.56 Times As Speedy as Morse

MAJOR GENERAL GEORGE O. SQUIER, who resigned on January 1, after forty years in the Signal Corps of the United States Army, having for seven years been chief signal officer, announced on May 15th the invention of a code system to replace international Morse for radio, cable and land lines. The Squier system will give 2.56 times as much speed as does the Morse code, the general says.

The adoption of the code, it is said, will vastly facilitate the transmitting of messages, will save hundreds of millions of dollars in cost and will reduce the sending time for cables and telegrams. The principle of the Squier system is, substantially, to use signals of the same lengths but of different intensities.

The alphabet now used for radio was adopted in Vienna in 1851. General Squier believes that the next international congress on communication will have as its chief problem the revision of the present codes. His plan will be presented for acceptance. At present a message, as sent by code, is filled with starts, stops and waits. His system calls for a steady wave of words.

In the Morse code it takes three times as long to send a dash as to send a dot. General Squier's system offers the same length of time but a different intensity for the two. The Morse elements call for one unit in the dot, three in the dash, one in the space between parts of the same character, three in the space between letters and five in the space between words. The Squier alphabet in these elements calls for one, one, cipher, one and two units, a saving in all of eight out of thirteen units.

In the sending of the letters j q and y in Morse twelve units are required. Only five are required in the Squier system. In addition, the general holds that much time will be saved in the recording of letters. In New York on a business trip, General Squier says that he is devoting all of his time to radio and code research and is hopeful of important results in the experiments.

Wireless Telephony

The preliminary conference for the drawing up of an International Wireless Telephony Agreement concluded its labors at Geneva, Switzerland on April 23rd. It has formulated the following conclusions: —(1) That certain wave-length fields should be exclusively reserved to wireless telephonic emissions and that those allotted to wireless telegraphy should be clearly differentiated; (2) that in view of the considerable contribution made by amateurs to the development and progress of wireless telephony, their rights should be taken into consideration and certain fields reserved to their experiments; (3) that the use of "deadened" waves should be exclusively confined to ship's distress signals and time signals.

The conference begs the League of Nations and the Universal Telegraphic Union to do everything possible to hasten the meeting of another inter-Governmental conference, and urges all wireless telephonic organizations to create a movement of public opinion and address petitions to their Governments urging them to approach Geneva and Berne so that the summoning of the convocation may be hastened.,

A resolution was also adopted proposing that all stations should at least once a week transmit a short programme in Esperanto. It was also urged that efforts should be pursued towards bringing about an international agreement regarding wireless telephony and towards establishing a permanent link between transmitting stations and wireless companies and publications with headquarters at Geneva.

In conclusion, the conference expressed the hope that those States which forbid the use of wireless telephony should reconsider their decision and license amateur stations.

Cape Town Radio Station

THE construction of the station is well in hand—four masts are now being erected, and are well advanced. In all there will be 16 masts 800 ft. high, and 32 masts of 300 ft. The staff employed at the present time numbers about 500, and the equipment of the station is expected to cost about £500,000. The station will cover an area of about 4½ miles square.

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Operation of Regenerative Receivers

By A. K. PHILLIPI, Radio Engineer,
Westinghouse Electric & Manufacturing Company.

The broadcasting of concerts, speeches, and many other interesting features by radio has increased to such an extent that thousands of receiving sets have been installed in homes, clubs and churches.

The opportunity afforded the public today to listen to good concerts and speeches by men prominent in all branches of science and industry without having to leave their own homes was, a few years ago, unthought of.

How many of you listening in are sure that your listening in is not preventing some other person from enjoying some radio program? By this I do not mean that you should lend them your receiving set, but that you, by the improper manipulation of your set, are causing a disturbance in the air that interferes with your neighbor's proper reception of the program.

How many of you, never having driven an automobile, would go to a dealer and buy a car, get in, and drive away, without first being instructed in driving and handling a car? Such a person would be considered a public nuisance and would soon be arrested.

While the operating of a radio set by a person not knowing just what he is doing with it will not endanger the lives or property of others, yet it can cause so much annoyance that it greatly mars the pleasure of others. The majority of people are good sports and play the game fairly to the best of their ability and people who do cause these disturbances are usually those who are unfamiliar with the operation of their receiving units.

When a receiving set of standard make is bought, an instruction book which tells how to operate the unit is generally included with the equipment, and a careful study of this book will give the operator a fair idea of what to do and how to do it, so as to get the best results as well as to cause the least interference possible while tuning in the desired station.

It is impossible for all of us to be electrical engineers or radiotricians. Neither, can we all be automotive engineers or auto mechanics, yet thousands of people drive their own car in such a way that they bother no one. These people are good sports.

Radio listeners are not all good sports, but the majority of them are and the reason they so often cause disturbances in the air is because in most cases, they are not aware that they do so. It is my purpose to point out some of the things to do and what not to do when tuning in, so as to prevent disturbances which can be heard by other listeners.

First of all, the radio set should be of a good design. Secondly, it should be connected up properly. We now turn on the filaments of the tubes to their proper brilliancy. This varies with the different types of tubes used. With the tickler or amplification dial or pointer turned to zero, we next move the tuning dial or dials slowly from left to right listening for signals. If no signal is heard, the tickler or amplification dial should be advanced slightly from the zero position on the dial, and again the tuner dials should be turned slowly over their range. Should a signal be heard but faintly, the tickler should be advanced as far as possible without causing a hissing sound, which indicates that the tube has passed the point of greatest regeneration and is oscillating. These oscillations are just like another transmitting station sending out signals as they are heard by other receiving sets and are known as "birdies." The tickler should be turned back until the signal is cleared up or even a little past that point, for a too strong signal may cause the detector tube to break over and oscillate again.

The best way to make sure your detector tube is not disturbing others is to plot a tickler diagram. This is done as follows: after the tubes are lighted to the proper brilliancy, the tuner is placed at zero and the tickler is advanced until a click is heard. At this point the tube starts to oscillate. Then mark down the readings in two columns, one marked tickler and the other, tuner. Next the tuner is advanced one large division, and again the tickler is advanced until the click is heard, and these readings should be taken. This procedure is carried out over the entire tuner scale, and it can readily be seen that, with the use of this set of readings, one will be able to set the tickler or amplification pointer to a division just below the oscillating point.

Now it is possible that the click or breaking point of the tube may not be heard by merely turning the tickler. If so, the operator should tap the antenna post with his finger and, when the tube is not oscillating, he will hear only a signal click. As soon as the tube starts to oscillate,, the operator will get a click when he touches the antenna post, and another click when he takes his finger from the post, or in other words a double click. Now it is not advisable to do this during the program period, but during the day when the chance of disturbing others is at a minimum.

The ideal regenerative receiver and antenna will have what is termed a flat tickler curve. By this we mean that it will be possible to put the tickler at a certain point and turn the tuner any place and be at maximum regeneration without causing oscillation. If the set has this characteristic, much less trouble tuning in stations without annoying others will be experienced.

The reception of signals at zero beat causes more interference than any other method of tuning and should be discouraged. The results obtained are not at all satisfactory unless one juggles the vernier or tickler dial. Each movement of either dial causes the detector tube to transmit weird signals and these in turn are heard by all

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local listeners. Again the varying strength of signals may cause the detector tube to flop from one side or the other and ruins the program not only of the people but of the person tuning the set as well. The crystal type of radio receiver, as well as those having one or more stages of radio frequency amplification, causes no disturbance of this kind.

In conclusion let me say that it is possible, with the co-operation of all radio listeners, to clear the air of "birdies," or the "wail of lost souls,," as they so aptly have been called, if each and every one of us will take precaution to see that our detector tubes are not oscillating. To do so demands that we all to the best of our ability observe the golden rule.

If the method of operating a set is still not clear, the local radio dealer or distributor, I feel sure, will give any information desired on this subject.

Transmits 1,000 Words a Minute

STRIKING evidence of the advancement made in invention during 1923 is found in the recent exhibit of telegraphic and other instruments at the British Imperial College of Science and Technology. The most notable development is in telegraphy; delay in submarine cabling has been largely eliminated by utilizing the action of the light on selenium, which responds so rapidly that the signal sent out is recorded even before the full current has passed over the wire.

A magnetic telegraphic drum recorder is shown, capable of speeding up messages to 1,000 words a minute. This is effected by the current of the incoming signal passing through coils contained in a rapidly revolving iron drum and turning it into a magnet for a brief space, thus attracting a slight piece of iron, shaped like a brake shoe. This operates a fine syphon tube charged with ink, causing it to record the signal on the paper tape as it flies past it.

Another exhibit is an "undulator," or an instrument used in high speed wireless telegraphy, capable of printing on an endless slip of paper up to 300 words a minute.

Telegraph and Telephone Life Insurance Association

ASSESSMENT Nos. 822, 823, 824 and 825 have been levied by the Telegraph and Telephone Life Insurance Association, New York, to meet the claims arising from the death of Joseph Baxa, aged fifty-three years, Cleveland, Ohio; James P. Cassidy, aged eighty-one, Minneapolis, Minn.; George A. Putman, aged seventy-three, St. Louis, Mo., Prentiss W. Drew, aged eighty-one, Chicago; Harvey F. Bickell, aged seventy-two, Indianapolis, Ind., and Aaron E. Ackerman, aged sixty-nine, Oradell, N. J.

Wireless War on Crime

THERE is no more up-to-date crime detecting organization in the world than Scotland Yards, London, England. An important new department is now in course of preparation. High up in the offices at the famous police headquarters is a suite of rooms containing all the latest appliances in wireless telegraphy and telephony. Here a number of young and enthusiastic detectives are studying the details of the mysterious ether waves, which have already been employed to a limited extent in the capture of evil-doers. In High street, Barnes, is a large red-brick building within a stone's throw of the river, containing police motor-cars on which wireless apparatus is fitted These travelling stations can pick up messages while racing at top speed through traffic or far away out on the great arterial roads radiating from London. It is the intention of the authorities to utilize wireless extensively in certain branches of crime investigation. When the new scheme is completed it will be possible to communicate immediately and simultaneously with every metropolitan police-station and also with the headquarters of every provincial force. Interesting experiments have been conducted lately between "the Yard" and Barnes in order to test the efficiency of the apparatus.

On lonely commons and heaths around London exciting encounters between motor "bandits" and armed police have startled pedestrians in the early mornings.

A quiet assurance that it was only a film show has easily satisfied the curious inquirer. As a matter of fact, however, these scenes have nothing to do with "pictures," but form part of the education and training of the modern theif-catcher. Police wireless, however, will not alone be applied to cases of fleeing bandits. The capture of professional criminals whose haunts are known is frequently difficult because the delay involved in visiting their lairs has enabled them to cover up their tracks by the time the police arrived. In future, officers of the law will be able to ascertain instantly which of their regular acquaintances is not at home, and the absentees will be invited to give an explanation. Bill Sykes, returning leisurely by motor with plunder from a country mansion will find the police waiting to receive him on his arrival at the house of his friend Fagin, simply because the old system of circulating police information has been superseded by wireless. Both rascals therefore will be caught red-handed with the "stuff" before it can be disposed of.

Confidence men, after a good day in the Strand among Colonial visitors, will find their natural foes waiting for them before they can don a disguise and get away to the Continent. Not only will wireless cut short the career of the daring criminal, but it will enable the police to retrieve a much larger proportion of plunder than is possible under present conditions.

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Radio Corporation of Amercia

DAVID SARNOFF, vice-president and general manager, accompanied by E. E. Bucher, sales manager and Quinton Adams, district sales manager, returned to New York on June 6th, after attending the Convention of Electrical Distributors and Jobbers at Hot Springs, Va. Mr. Sarnoff spoke extemporaneously upon distributor's problems and various solutions.

The Advertising and Publicity Department is now located in room 1868 of the Woolworth Building, having changed its quarters the first of June. The Sales Service Production Department has moved from the twentieth floor to room 1801, recently vacated by the Advertising and Publicity Departments. The Export Division has also moved from the twentieth floor to the quarters formerly occupied by the Credit and Accounting Department which is now located in room 1868.

Vacation time is making its appearance and soon various members of the Radio Corporation's organization will be finding time to forget business routine by a few weeks acquaintance with Nature, whether it be at the seashore or the mountains.

OBITUARY

DANIEL B. GRANDY, a pioneer telephone man and an old time telegrapher, died after a brief illness at his home in St. Louis, Mo., on May 21st, in his 72nd year, after fifty-seven years of service, twenty-five of which were with the American Telephone and Telegraph Company in Madison and St. Louis Testrooms, thirteen years as Chief Operator for the Postal Telegraph-Cable Company in St. Louis and Indianapolis and nineteen years with the Western Union Telegraph Company in Boston, New York City, Washington, D. C., San Francisco and St. Louis.

Mr. Grandy was of an inventive turn of mind and collaborated with W. E. Atherton in perfecting the first control relay used by the American Telephone and Telegraph Company in connection with the bridge duplex. He was considered one of the most proficient telegraphers among the old timers, and was the winner of several fast sending tournaments. He is survived by his wife and a daughter.

The deceased was a member of the Telephone Pioneers of America and of the Sons of the Revolution.

EUGENE J. CHAPMAN of 61 Douglas Road, wholesale distributor of the Victor Victrola Company of Rochester, N. Y., died on May 28th at the Highland Hospital, after an illness of a week. He is survived by his wife, two daughters and a sister.

Mr. Chapman was born in Oswego on December 5, 1862. He went to Rochester in 1881 to manage the telegraph office of the Baltimore and Ohio Telegraph Company. Some years later he engaged in the manufacture of pianos under the name of the E. J. Chapman Piano Company. Mr. Chapman was an extensive operator in Rochester real estate.

Warren Y. Soper

THE Ottawa Citizen of May 17th, contains about one page of a story of the funeral of the late Warren Y. Soper of the firm of Ahearn and Soper, Ltd., electrical supplies of that city. The remains of Mr. Soper were laid to rest in Beechwood Cemetery, Ottawa, Ont., on May 16th and the funeral was one of the largest that ever took place in that city. Mr. Soper was one of the best known citizens of Canada, and friends from all over Canada and the United States journeyed to Ottawa to pay their last respects to the departed.

Reverend Channell G. Hepburn, who officiated at the funeral services said in part:

"I am the resurrection and the life," followed by another familar passage from John's gospel, chapter 14, "Let not your heart be troubled, ye believe in God believe also in me. In My Father's house are many mansions." Then followed the reading of 1st Corinthians, chapter 15. Afterwards Rev. Mr. Hepburn remarked that he desired to say just a word, not in any sense a funeral oration, because he was sure that their departed friend would not desire it, nor was it their custom in their service.

But he would like to pay just a small tribute, he said, to one who had not only been wonderfully successful in this world, but who in winning success had endeared himself to those with whom he came in contact, by reason of certain very splendid qualities in his character.

Rev. Mr. Hepburn said that many of them there could speak with far better and longer knowledge of the late Mr. Soper than he could.

But as one who had known him by reason of his prominent position in the business world, his endearing qualities, and as a family man, he did feel, said Rev. Mr. Hepburn, that it was only right that his passing should be marked, as it was that day, by such a large gathering of representative citizens who had come to pay a tribute of respect to the character of Mr. Soper. Just recently, added Rev. Mr. Hepburn, someone speaking of the late Lord Shaughnessy had said that the best epitaph for him would be the one in the great St. Paul's Cathedral, London, to its designer: "If you wish to see my monument, look around you." Not for some large stone, or splendid bust of bronze, but to the great creation of his brain. Rev. Mr. Hepburn thought something of the same thing might be said of the splendid citizen they were mourning that day.

He called attention to the great enterprises he had helped to establish and that bore his name together with that of his partner, another of the great citizens of Ottawa. These men had won esteem, not only from Ottawa, but from all Canada and other lands.

THE chief operator is the man who comes too early when we are late and too late when we are early.

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EDITORIAL COMMENT

THE June 1st issue of Telegraph and Telegraph Age began the forty-second year of the paper's existence. No publication printed in the interests of the telegraph profession has ever lived to such an old age. When it is considered that the present editor and publisher founded the paper forty-two years ago, it is remarkable. During that entire time the publication has rendered to its readers thousands of favors of one kind or another, but all of which necessitated more or less trouble on our part to comply with, and this service has aways been rendered without charge. We hope that the paper may continue to be successful in the future, whether it remains in our hands or whether it is taken over by others to manage. It is a satisfaction to us to know that we have always endeavored to fulfill the duties required by a professional paper and that we have been successful.

Telegraph Auxiliaries

IN carrying on modern telegraph service, perhaps the most important auxiliary to the wire and apparatus plant is the extensive system of pneumatic tubes employed.

It was in the year 1875 that George B. Prescott, electrician, and Thomas T. Eckert, general superintendent of the Western Union Telegraph Company, were sent to Europe to examine, among other late telegraph improvements, a pneumatic tube system then in use in London. Three years later underground pneumatic tubes were laid down in New York between the main office of the Western Union Telegraph Company at 195 Broadway, and the Stock Exchange Building.

Extensions gradually followed and in 1885 an underground tube was laid between the main office at Broadway and Dey Streets and a branch office located at 23d Street and Fifth Avenue, New York.

Some of the earliest tube work was done by Charles Wolff, who had a shop on Cedar Street, New York. Mr. Wolff is still active at the age of eighty-seven years.

Today, in practically every city where there are terminal telegraph offices, extensive tube systems are in operation as auxiliaries to the main (electrical) elements of the plant. Both of the large telegraph, telephone and cable companies and a number of railroads are extensive users of pneumatic tube systems.

Tubes from a few feet to miles in length carry annually millions of telegrams, cablegrams, radiograms, letters, service notices, orders, et cetera, from point to point in office building and between buildings.

There are short-distance systems operated by economical foot-power blowers which in some cases meet the needs of telegraph or railroad service.

Improvement in late years in the design of motor-operated blowers is evidenced by the comparatively small motor-blower units which now serve to operate one or more tubes extending to remote points. Also, many improvements have been made looking to flexibility of the system. In telegraph offices, large and small, practically every requirement of traffic has been met satisfactorily by the employment of pneumatic tubes.

In commercial telegraph service competition of the air mail service and the telephone is making it necessary to apply to the movement of message traffic every device which will clip a minute or two from the transit time of messages through terminal offices.

In railroad service high labor charges and the growing scarcity of the right type of boys is developing many cases where pneumatic tubes can be installed to the advantage of service and of economy.

The many installations of pneumatic tubes in use by the Western Union Telegraph Company, Postal Telegraph-Cable Company, Cable Companies, General Electric Company, and others, have been manufactured and installed by the Pneumatic Tube Supply Company, North Plainfield, New Jersey, under the direction of John T. Needham, an old time telegrapher and who has been engaged in this work continuously during the past twenty years.

Joseph Henry in the Hall of Fame

AT New York University on the afternoon of Tuesday, May 13, Thomas A. Edison unveiled in the Hall of Fame, the bust of Joseph Henry, educator and scientist. The bust was presented to the University by the American Institute of Electrical Engineers and provided from funds raised by member subscription and by appropriation. The bust is one of ten just added to the many already in place above commemorative tablets to famous Americans. Frank B. Jewett, former president of the Institute, made the commemorative address. Dr. Jewett called attention to Henry's independent discovery of electromagnetic induction, his hypothesis concerning the oscillatory nature of electric discharge and his part in the manufacture of insulated wire. The speaker also pointed out the part he played in the building up of the Smithsonian Institution and of the National Academy of Sciences.

In conclusion Dr. Jewett said, "Henry was perhaps the foremost American physicist. And it is well attested by every record that he was a man of varied culture, of large breadth and liberality of views, of generous impulses, of great gentleness, of courtesy of manner combined with equal firmness of purpose and energy of action. He was, in every way and in the best that the word denotes, a scientist."

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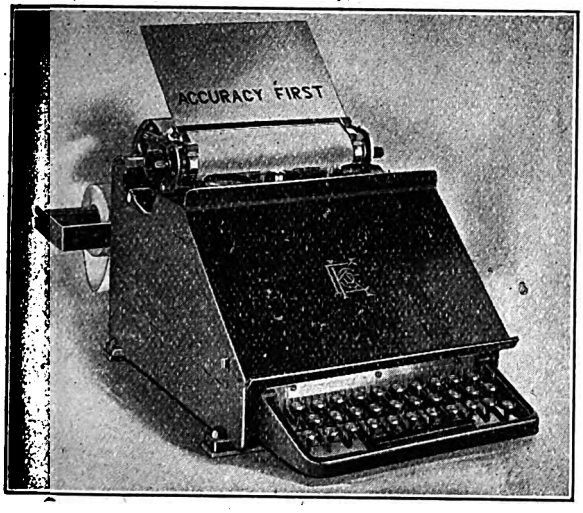
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER



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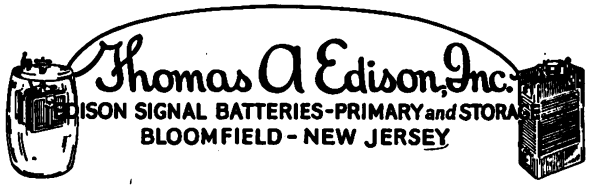
The Bee and the Sunlight

It was just after I had returned from luncheon and comfortably seated at my desk that I observed a large bee walking across the window sill.

Obviously the bee was in trouble. His progress though determined was painfully slow. After dragging himself two thirds of the way across the window sill he finally came to rest in a tiny patch of sunlight that filtered through the awning.

With unerring instinct the bee sought the sunlight, confirming the suspicion that he was in trouble and by the same unerring instinct he knew that the sunlight would remedy the trouble.

Telephone Engineers are much in the same position. Assailed from all sides with complaints, criticism, trouble and tribulation, it is only natural that they, too, find the remedy. In ever increasing numbers Telephone Engineers are making a beeline to Edison Primary Batteries, realizing that like the bee they must find the sunlight.



ST. LOUIS
Railway Exchange Bldg.

CHICAGO
Peoples Gas Bldg.

SAN FRANCISCO
Balboa Bldg.

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NEW YORK-CHICAGO

THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

A MEETING of Committee No. 2—Construction and Maintenance—Inside Plant, was held at Haddon Hall, Atlantic City, N. J. on June 11th and 12th.

A meeting of a Sub-Committee of No. 6—Message Traffic, was held in the office of C. E. Marsh, superintendent of telegraph, Kansas City Terminal Railway, Union Station, Kansas City, on June 4th, at which were present P. F. Frenzer, Omaha; H. C. Chase, Topeka, Kansas; J. H. Brennan, Springfield, Mo.; F. E. Bentley, St. Louis, Mo.; and W. A. Fairbanks, secretary, New York.

A meeting of Committee No. 7—Inductive Interference was held at 30 Vesey Street, New York, on June 3rd and 4th. Those present were L. Behner, Pittsburgh; A. H. Armstrong, Schenectady, N. Y.; R. D. Evans, Pittsburgh; M. R. Greenamyer, Philadelphia; W. A. Jackson, Detroit, Mich.; G. W. Jett, Roanoke, Va.; H. M. Trueblood and R. R. Whitehouse, New York.

A meeting of Committee No. 11—Telegraph and Telephone Transmission was held at 30 Vesey Street, New York, on June 5th and 6th, at which were present B. F. Thompson, Baltimore, Md.; J. H. Ditch, Philadelphia; E, V. Adams, W. H. Capen, C. F. Stearns and F. S. Foland, New York.

The annual meeting of the Telegraph and Telephone Section of the American Railway Association will take place at the Chateau Frontenac, Quebec, Que., on September 9th, 10th and 11th. There promises to be an unusually large attendance at this annual gathering. The papers to be discussed, which will be distributed in ample time before the meeting, will be important from the railroad standpoint and for this reason alone there ought to be a large attendance.

Promoted

C. W. HARDING was promoted assistant superintendent of telegraph on May 7th, by J. M. Rapelje, vice president in charge of operation of the Northern Pacific Railroad.

Mr. Harding will have charge of lines east of Paradise, Mont.

He began work for the Northern Pacific as relay operator at St. Paul in 1895. Seven years later he was promoted to wire chief at Dickinson, N. D. In 1910 Mr. Harding was transferred to the office of superintendent of telegraph at St. Paul and was promoted to chief clerk the following year.

Coming Conventions

OLD Time Telegraphers' and Historical Association, Hotel Roosevelt, New Orleans, La., October 30th, 31st and November 1st.

Telephone Pioneers of America, Chicago, October 10th and 11th.

Telegraph and Telephone Section of the American Railway Association, Hotel Frontenac, Quebec, Que., September 9th, 10th and 11th.

THEY WANT THE BEST

Another of the large New York Press installations have been converted to Morkrum Typebar apparatus.

The International News Service has used Morkrum apparatus for seven years and when their traffic increase demanded new apparatus, four Transmitting sets and thirty-two Receiving sets of Morkrum typebar epuipment were ordered.

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The Application of Radio Engineering Principles to Submarine Telegraph Cables

By Major General George O. Squier, *United States Army.**

(*Continued from page 245, June 1st Issue.*)

Experimental Results.

In the Army Appropriation Act for the fiscal year 1923-24, funds were authorized by Congress for the replacement of the Signal Corps Alaskan cable system from Seattle, Washington, to Ketchikan, Alaska, and to certain points beyond. Under this appropriation, a developmental contract was entered into in May, 1923, between the Signal Corps of the Army and William M. Bruce, Jr., the well known cable engineer. Experiments have been carried on during the past year at the laboratory of Mr. Bruce, at Springfield, Ohio.

A Universal Telegraph Transmitter.

The first step required was the design of a transmitter mechanism which would automatically transmit the radio type of alphabet. The writer had previously constructed a special type of cable dynamo for this purpose which is described in a paper presented to the Physical Society of London in 1915, referred to previously. Careful tests were first made with this dynamo transmitting through a suitable artificial cable in the laboratory. It was finally decided to supersede the dynamo type of transmitter for various reasons, and design a transmitter which would employ the usual storage battery which is at present used on cables as a source of power.

The only change required in present automatic cable transmitters, which have stood the test of actual practice for years, is to provide a mechanism by which the regular battery now employed to send square-topped waves according to the present cable Morse alphabet, shall send waves of the sine wave type always alternating in sign and changing in amplitude to distinguish the dots, dashes and spaces. One complete revolution produces a complete cycle, and the disc, which is about four inches in diameter is mounted vertically. Upon the shaft of the motor which drives the transmitting tape are mounted two brushes which rotate with the shaft and contact with the segments. This arrangement insures positive synchronism at all times between the movement of the tape and the applied battery so that the phase relation is under accurate control.

The amplitude of the semi-sinus of the alternating current produced is under complete control by the adjustable resistances.

The tape transmitter used is of the Creed type, which is one of the best known. The method of course applies to any of the well known types of automatic cable transmitters.

*Taken from the Journal of Franklin Institute.

The cable operator proceeds as usual in transmitting traffic and has nothing new to learn in any of his operations.

For such types of circuit we merely substitute for the variable resistances, suitable circuit arrangements by which the dot and dash contacts at the tape introduce different modulating frequencies instead of amplitude of the carrier frequency as is necessary in long cables. In space radio the change of amplitude method is objectionable on account of "fading," and in such circuits, other things being equal, we have a free hand to distinguish the signals by change of frequency.

In automatic telegraphy today we find a variety of forms of transmitting tape, some of them quite complicated and difficult to keep in operation. In this universal transmitter, the simplest form of tape is adopted, viz., a round perforation on the upper side of the feed holes for a dot and a similar perforation on the lower side for a dash.

This is tape reduced to its lowest terms, and provides a universal "tape language" for any type of circuit, whether space radio, line radio or submarine cable. It also permits a certain free interchange of perforated tape between these circuits of different classes, whatever may be the actual speed in each.

The Propagation of the Signals Through the Cable.

It should be noted that the transmitter described impresses upon the cable proper a continuous modulated wave of voltage or current of a definite fundamental frequency and wave length. This wave is modulated at the zero phase of the resultant current flowing into the circuit, thereby changing the amplitude of the individual half cycles in three stages to represent dots, dashes and spaces. The relative values of these changes are under complete control and are adjusted to suit the particular cable being used. Considering the cable alone, we know that the best condition for efficient transmission is fulfilled when each of the three amplitudes has the same value, and the case becomes the well known example of power transmission by alternating current. In this limiting case, the speed of transmission of the then equal signals becomes enormously increased. The definition is always 100 percent and is independent of the frequency, the voltage used, or the length of the cable. Such a condition would represent a message composed of a series of the letters A or N of the present cable alphabet joined without spaces between.

We learn from this that, as far as the cable alone is concerned, the three amplitudes should differ only sufficiently to permit differentiation at the receiving end of the cable. Here the receiving apparatus enters the field as a controlling factor so that the final adjustment of the transmitter is only found by trial and adjustment at both ends of the cable. The value

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of the space current requires particular attention, for although it is finally eliminated from the record prepared for the eye, yet it has most important functions in keeping a whole chain of cables in operation from beginning to end, with perfect synchronism.

In the case of a single span of cable, we can adjust the transmitter so that the space current is of such a value as to just disappear by attenuation at the receiving end and still retain the advantages of comparatively large value of this current at the transmitting end for assisting in bridge balance and also in transmission through the cable itself.

Increased Voltage Desirable.

The voltage and current distribution curves draw attention to the desirability of increasing the transmitting voltage within safe limits. In present practice, all ocean cables operate at from 50 to 80 volts at the bridge apex, and much less than this upon the cable due to the capacity reactance of the large condensers in the arms of the bridge.

With an alternating current in the steady state we know that the energy impressed upon the cable varies directly with the square of the voltage used. We also see that in this case the voltage decays so rapidly that at a frequency as low as 10 per second it is reduced to ½ its value at about 90 nautical miles from shore. We may therefore regard the first 90 nautical miles of this cable as a "wave shute" used especially to launch the modulated a.c. wave upon its path through the real cable, being assured that no harmful voltage stress can possibly occur upon the deep-sea portion beyond. Indeed, we can afford, if necessary, to give special construction to this 90 nautical miles at each end of the cable to enable us to employ any transmitting voltage found useful in practice.

The main reason why higher voltages have not been employed with the present system is not from fear of injuring cables as manufactured at present, but simply because little, if any, increment of speed of signaling is obtained by such increase, due to the piling up effects when using the present form of alphabet.

The Alternating Current Produces Maximum Received Amplitude.

There has been some discussion from time to time, when considering the alternating current system of cable signaling, of the relative amplitude and shape of the received signals over a long cable for different wave shapes at the transmitter.

In all long cables operated at high speed, we know that the Fourier series of odd harmonic waves which are required to build up the square-topped wave are absorbed in the cable and never reach the receiving end, and only the fundamental wave has appreciable effect upon the receiver.

Other things being equal, we can round off the corners in various ways as we please for other reasons, such as improving the bridge balance at the transmitting end, but the received signals in each case will be exactly the same.

All these theoretical alternating e.m.f's are in operation at the transmitter and each sends its own current into the cable independently of the others. These harmonics have appreciable amplitude at the transmitting end, but soon decay in the cable itself and have no significant effect at the receiver.

The relative charges measured in coulombs in sending a single semi-cycle into the cable may be measured by the areas of the voltage wave impressed. These areas are as about .6 to 1. This extra charge of about .4 of the maximum, or .24 of the semi-sinus takes no practical part in signaling but does serious harm because we must get rid of it at the transmitting end to bring the cable back to a neutral condition so we can send the succeeding signal. This effect is multiplied when we send any one of the five letters, H, I, M, O or S. In getting rid of this superfluous charge at the transmitting end of the cable it is found necessary to disconnect the battery entirely after about 75 percent of the whole time of the signal and connect the cable directly to earth. These idle harmonics are then discharged to earth during the last quarter of the time of the signal and this discharge is shown in the spark at the instant of disconnecting the battery by opening the key.

Again the assumption is theoretical for the reason that a voltage wave must be impressed upon the cable at the apex of the bridge and in present practice the bridge arms require large condensers of 60 m.f. or more.

These condensers of course materially alter the shape of the wave and the tops of the wave are no longer horizontal but also decay from the full battery voltage at the beginning of each signal to some lesser value at the instants of cut-off at three-quarters of the time of the signal. The rate of this particular decay depends upon the size of the condenser, so that here also the required transmitting condensers operate to reduce the area of the battery effect upon the cable itself. Enough has been said to show that whatever the circuit arrangements used in present practice, a simple alternating current produces a greater amplitude of received signals than battery reversals of the same frequency and maximum voltage value. This merely means that it delivers more energy at the receiving end of the cable and more energy means more speed.

Malcolm has worked out a great variety of combinations of present cable signals by computing their "curves of arrival." The extreme distortion in long cables is such that the effects of what is called "tailing" of the signals produce in certain combinations, such as in the words "banana cancer" for instance, changes in shape of certain letters of "cancer" traceable even back to the word immediately preceding.

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In other words, we must know the history of the cable immediately preceding a signal to predict its exact form in any particular case.

When we adopt a modulated alternating current form of alphabet, although of course we still have certain minimum transient effects, the physics of the whole process becomes greatly simplified.

(*To be Continued.*)

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WILLIAM MAVER, JR. in renewing his subscription for another year writes: "I always read Telegraph and Telephone Age with interest and pleasure."

Great Northern Telegraph

THAT wireless competition is becoming an increasingly serious menace to the various cable enterprises is conceded in the report of the Great Northern Telegraph Company of Denmark, and the market in Submarine Cable shares was weak on the admission. The Norwegian-American wireless connection, owing to lower rates, deprived the cable route of so much of the traffic between America and the countries of Northern Europe served that an equalization of cable and radio rates was decided upon, with the result that a considerable part of the correspondence lost was regained. Further competition is to be expected when the large Swedish station is completed while traffic between Scandanavia and France, the bulk of which formerly passed over the company's cables, is now being conducted by wireless. Furthermore, there is the prospect of formidable wireless competition to the Far East when the powerful station near Peking begins to function.

In spite of all difficulties the company nevertheless continues to prosper, though its profits are much below those earned when wireless competition was in its infancy. Thus, last year's net surplus of £368,100 compares with £373,200 for the previous twelve months, £438,700 for 1921 and £640,700 for 1920. The shareholders receive for the third consecutive year a dividend of 22 per cent., a rate only twice exceeded in the course of the past decade. Reserve appropriations have been considerably reduced in recent years, but the existing reserve of £3,334,400 show a gain of £141,800 on the previous year's figure, thanks to a substantial decrease in the amount written off for extraordinary expenses.

The company is fortunate in having secured an extension of its concessions in Denmark, England and Sweden. In England it will have the right to deal with the public through the numerous provincial branches of the Eastern Telegraph Company. But there is no denying that the company, like other cable concerns, is up against a big proposition in wireless competition. Should radio services be opened up between Europe and the Far East and other overseas countries at rates lower than those of the cables, the cable companies would be placed in an unfavorable position, "which," to quote the report, "they would scarcely allow to continue for any length of time."—*London Financial Times.*

Telegraphers of Today

WE find that we have on hand quite a number of copies of "Telegraphers of Today," which is a book made up of 354 pages, printed on heavy coated paper measuring eleven inches wide by fourteen inches in height. This large book contains over a thousand sketches of telegraph people, together with a biography of their lives. It is a splendid work and was printed in 1894. It is used extensively in the libraries of prominent telegraph and railroad people. While these books last, we will sell them at $5.00 each and we will prepay the carrying charges. Address and make remittances to Telegraph and Telephone Age, 253 Broadway, New York.

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PERSONAL

HARRY C. WILSON, ex-Superintendent of the Government Telegraphs of Jamaica, British West Indies, is in New York on a visit. Mr. Wilson has been a resident of Kingston, for over fifty years. Prior to his going to Jamaica he was in the cable service, in Egypt and South America. Two of his brothers are cable men, Frank, ex-superintendent of the Commercial Cable Co., Boston, now of Oneida, N. Y. and Arthur, in New York City.

POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice president and general manager, H. Hetzel, travelling auditor and C. E. Bagley, superintendent, recently visited Atlantic City where Mr. Reynolds addressed the Lions Club at a noon-day luncheon.

W. C. Daviet, vice-president, is now on a trip of inspection at the larger offices in the Western Division where the film "The Pulse of the World" is being shown.

W. B. Dunn, secretary, R. J. Hall, manager, bureau of tariffs and taxes, and F. P. Phillips, superintendent of plant, eastern division, recently spent a few days in Baltimore on company business.

R. Gould, general plant supervisor, has returned from the Southwest where he has been supervising the construction of the new line between Fort Worth and Los Angeles.

Wm. G. Ernst, equipment supervisor in the plant and engineering department, and Miss Lenore E. Foley of Pomona, N. Y., were married on May 4th, at Spring Valley, N. Y. On their return from Atlantic City, they will reside in Suffern, N. Y.

THE Postal Telegraph Cable Company has begun work on a new line from Los Angeles, Calif., to Fort Worth, Texas.

Improvement of the service between Los Angeles and San Francisco, Portland and Seattle through the stringing of four additional lines of wire from Los Angeles to those cities was also announced by Superintendent Morrison of Los Angeles.

Eighteen construction crews, comprising nearly 550 men, are at work on the new lines, which are to be completed by September at a cost of approximately $4,000,000.

The Fort Worth line will give Postal service to territory it has not covered in the past. From Los Angeles the line runs to Redlands, thence to Yuma, Ariz., north to Phoenix, Ariz., south to Tucson, Ariz., and east through Deming, N. M. There it will connect with three Postal lines which extend through the southern states and up the Atlantic coast to Washington and New York

The new line will be of the four-wire multiplex, or 16-circuit type, and 60,000 poles and 6,000 miles of copper wire will be used in its construction.

Two of the new Los Angeles-Seattle wires will be of a heavier type than ever before used for telegraphic communication. These wires will give telephone as well as telegraphic service.

A biography of the historical, social and business life of Montgomery, Ala., is contained in the leading article of the May issue of The Postal Telegraph, the official organ of the Postal Telegraph Cable Company. In the issue is contained a front and interior view of new offices of the concern in the former Fourth National Bank building on Commerce Street. Photographs of Fred H. Sholar, manager, and A. S. Jackson, chief operator of the concern accompany the article.

The article on Montgomery proper has many views of the most notable points in and around the city. The state capitol, Carnegie library, first white house of the Confederacy, the governor's mansion and various residences in the city, including Morningview, are among the featured points of interest in the city.

Commercial Pacific Cable Co.

EDOUARD DESNOUEE, for many years superintendent at various stations of the company, has been pensioned.

Herbert Taylor, who has been connected with the Company since 1903 in the capacities of operator and supervisor, has been appointed superintendent of that Company's station at Midway Islands. Mr. Taylor, prior to his engagement by the Pacific Company was employed by the Commercial Cable Company at Waterville, Ireland.

Old Time Telegraphers' and Historical Association

PRESIDENT F. A. MOHR, announces the appointment of the following committees in connection with the coming reunion to be held in New Orleans, La., on October 30th, 31st and November 1st:—

Finance—Chas. A. Stair, chairman, F. W. Ellsworth, treasurer, W. B. Reily, Chas. P. Weinberger, Wm. A. Porteous, G. P. Brinkley.

Membership—J. F. Wilson, chairman, F. H. Austin, J. P. Rohling, P. R. Napier, W. T. Strawbridge.

Entertainment—Chas. A. Weinberger, chairman, Jesse Hargrave, W. A. Porteous, J. D. McLelland, J. G. Hilbert.

Reception—Henry W. Robinson, chairman, W. A. Porteous, G. T. Murray, L. W. Sauvinet, B. P. Hancock.

Registration and Publicity—Robert Ewing, chairman, W. A. Porteous, R. F. Blanchard, G. P. Brinkley and W. H. Shroeder.

The headquarters will be the Hotel Roosevelt, formerly the Grunewald.

Liquor Ships and Cables

THE Western Union and the Commercial and French cable companies are complaining to the United States Treasury and coastguards, alleging that liquor ships are breaking Atlantic cables by dragging their anchors.

The Commercial Company is offering £200 reward for the conviction of the culprits. The company also alleges that liquor ships often destroy Pacific cables.

The French Cable Company states that its losses this year from this cause total £10,000.

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THE WESTERN UNION TELEGRAPH CO.

E. R. SHUTE, operating engineer, New York, was in Cleveland during the National convention on business connected with the service.

Eastern Division

H. C. ENGLISH of Superintendent J. S. Calvert's staff, has been reassigned from the position of district commercial manager to district commercial agent and will devote his entire time to commercial development work at the larger offices in eastern, northern and northwestern Pennsylvania.

C. E. King has been appointed district commercial manager throughout the eastern region of Pennsylvania, and will have supervision over a great many of the points formerly in charge of Mr. English.

J. W. Reed, formerly district commercial manager in West Virginia and western Pennsylvania, has been appointed district commercial agent, having supervision over the larger fourth district offices in southeastern Pennsylvania and the entire state of West Virginia.

I. Michael of Superintendent J. S. Calvert's office, has been appointed to the position of service supervisor for the fourth district and his duties will call him to approximately fifty of the larger cities throughout Pennsylvania and West Virginia.

San Francisco Western Union Employees to Broadcast Concert

IT is quite natural that telegraph employees should become enthusiastic "Radio Fans" and it is believed that San Francisco is no exception to the rule.

Acting under the direction of the "SP. WU. Radio Bugs," a committee of employees of all departments have completed arrangements for the broadcasting of an "All-Star" 100 per cent Western Union Concert, on the evening of July 28, starting at 9 P. M. (Pacific Time) from station "KPO" Hale Brothers, Inc., broadcasting on 423 meters. "KPO" is the largest broadcasting station on the Pacific Coast and is daily achieving new distinction in reaching to distant points.

San Francisco is world-wide known as a music center and a city of music-loving people and among the employees of the Western Union Telegraph Company, are to be found many with more than the average ability, in fact, some who have attained the prefix of "Professional."

The program will open with an appropriate address by C. F. Newson, Pacific Division Commercial Manager, of General Manager M. T. Cook's office. Mr Newsom has the reputation of being not only a silver-tongued orator, but one who really says something worth while.

2—Soprano solo, Miss Clarie Harrington, Commercial Department; 3—Violin solo, Miss Reva Cutler, Traffic Department; Piano Accompaniment—Miss Ida Cutler, Traffic Department; 4—Baritone solo, Mr. Redfether, Traffic Department; 5—French Oboe solo, Mr. Remington, Accounting Department; Piano Accompaniment, Elizabeth Leiser, Accounting Department; 6—Contralto solo, Miss Maye Brown, Traffic Department; 7—Western Union Trio, G. M. Carter, leader, Traffic Department; 8—Soprano solo, Dorothy Marvin, Commercial Department; 9—Vocal solo, Mrs. Nell Welsh, Traffic Department; Piano Accompaniment, F. W. Thrapp, Traffic Department; 10—Quartet, R. T. Brown, leader, Plant Department.

Others will be added to this list before the date of the concert.

Radio fans in other cities and especially those included in the vast Western Union Family are invited to tune in for this concert and C. F. Newsom, care General Manager, Western Union Telegraph Company, San Francisco, or Station KPQ, San Francisco, will be delighted to receive by wire or by mail, during the concert or at the conclusion, comments on the broadcasting program.

The above outlined program is sure to prove entertaining and worth while and you will not regret the time consumed in listening in on this, the Initial Broadcasted Concert.

Western Union Asks Strike Injunction

CHARGING a conspiracy among unions to force the company to adopt the closed shop, the Western Union Telegraph Company on June 5th filed a bill for an injunction to restrain the International Brotherhood of Electrical Workers and other unions from interfering with the company or its properties.

The company also asks that the injunction restrain unions from calling a strike or destroying or damaging any of the company's property in Chicago, which is valued at $4,000,000, according to the bill.

In furtherance of the conspiracy alleged to force the closed shop on the corporation, the bill cites numerous acts of violence and interferences, such as the cutting of cables and wires and damage to the company's properties in Chicago within the last year.

Many of the violent acts charged were committed in connection with the installation of wires and other telegraphic equipment in new office buildings in the downtown district.

C. M. KNAUFT, repeater attendant in the Cincinnati, Ohio, office, while working on his roof in Cheviot, where he resides, fell off and broke his arm in two places and also fractured two ribs.

Death of Stephens

JAMES MCCONNELL STEPHENS died at his home in Atlanta, on May 24, of a complication brought on by a relapse from influenza. His death was sudden, as his friends and family believed he was improving.

Mr. Stephens was an outstanding figure for many years in the telegraph interests of the Southeastern Division of the Western Union Telegraph Company. Born in Canton, Georgia, November 11, 1849, the son of Edward Uriah Hannah McConnell Stephens, he experienced as a lad the vicissitudes of the Civil War, which laid his father's plantation in ruins. At the age of fifteen years he moved to the nearest town, Cartersville, and a few years later he came to Atlanta to make his home.

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His first position in Atlanta was as train dispatcher for the old state railroad under management of Governor Brown. Then he entered the service of the Western Union receiving rapid promotion and he was for many years manager of the Atlanta office, and later Southern Division superintendent. He retired with the latter rank.

Mr. Stephens' activities were not wholly confined to the telegraph interest. By nature a constructive force he had a part in the building of Atlanta from an ash heap to a great city. He was elected twice to the city council and once to the board of aldermen. He was president of the Mutual Loan and Banking Company and on the directors boards of other businesses. But his first interest was that of the Western Union. At his funeral, which was attended by many of his old friends, a special honorary escort was made up of the men who had served under him in the Western Union. One of these, unable to be present, wired: "He was the smartest man I ever knew and gave me the squarest deal of any man I ever worked for."

Although retired from active business for the past ten years Mr. Stephens took a keen interest in the development of the Western Union Telegraph Company and kept up his other business affiliations which demanded his personal attention. A man of fine judgment, of keen discrimination and rare kindliness of nature he had a host of friends from all walks of life who mourn his loss.

A Telegrapher When Conference is On

HOBBIES make strange palships. You hear of the automobile salesman who draws cartoons in his spare time; the man at the necktie counter who collects rattlesnake skins; the bank clerk who raises white mice or the professional man who is an expert clock repairer, after office hours. Merely hobbies, of course, but were any one of these persons deprived of the power of pursuing his chosen, bread and butter, vocation, dollars to doughnuts, turning his hobby to account would be his first thought.

If you have visited the Auditorium at Springfield, Mass., all during the reign of the Methodists you may have noticed at the right of the entrance, the Western Union Telegraph office, a branch service station of the local headquarters. It is devoted wholly to the receiving and sending of conference messages, personal as well as official. There are five persons on the staff and the man in charge is, by vocation, a Methodist Clergyman, Rev. W. Minor Lemen who holds a pastorate at Clarksville, Iowa. He is the official Western Union telegrapher for the conference, employed by the telegraph company. He has served in this capacity at every conference since 1904 and this will be his sixth quadriennial appearance.

Telegraphy is something more than a hobby with Mr. Lemen, it is his avocation. He'd rather be a minister and he has been one for the past forty-three years. But before that time he was first a messenger boy, then a telegrapher, and the old urge to play the keys has never deserted him. Neither has his skill been impaired by his devotion to the ministry, for he keeps a pony telegraph set in his home, so that when the time comes for him to go to the world conference of his church, his fingers may be as nimble and dexterous as those of the most practiced operator in the country.

Nevada, Where One in Every 150 Is in State University

WITH his eyes lifted to the top of the distant mountains, "The Man with the Upturned Face," Gutzon Borglum's statue of John W. Mackay, pioneer Nevada miner, standing in the quadrangle of the University of Nevada at Reno, expresses the spirit which has led that institution, the only place higher education is available in the least populated state in the country, through 50 years of successful struggle.

By continually looking up, the state and the university have raised upon the rock and in the sagebrush a distinctive educational institution. This achievement is recognized in a fiftieth anniversary celebration at commencement this week. The University of Nevada probably has a large proportion of its commonwealth's population as students than has any other state university. Although sixth largest in area, with her 110,000 square miles of mountain desert and fertile valley, Nevada is the smallest state in population. Forty-five cities in the United States boast more residents than the 78,000 persons who live within the borders of Nevada. Yet one of every 150 of these ranchers, miners, business and professional men, and their wives and children, is a student in the university now.

In this proportion, the University of Illinois, for example, as the educational institution of one of our largest political subdivisions, would have an enrollment of 43,000 from that state alone, in addition to students from other states. The enrollment at Illinois is about 8,000, of whom a considerable number are from other commonwealths.

That so large a proportion of the state's population is represented does not mean that the Nevada student body is provincial. Although 521 of the 855 students come from Nevada, every county being represented, there are also students from 23 other states, two dependencies and six foreign countries.

Necessarily Nevada is a compact little institution. Within her score of buildings, the newer ones colonial halls of brick with tall, white pillars, that stand on the campus hilltop are three colleges and seven schools. The largest college is that of arts and science, which includes the School of Education and the Nevada State Normal School. The College of Engineering, next in size, is composed of the Mackay School of Mines, one of the best-known schools of Mechanical Engineering, Electrical Engineering and Civil Engineering. With the development of agriculture in some of the portions of the state possible of irrigation, the College of Agriculture was established. It is composed of

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the School of Home Economics and the School of Agriculture.

The contact between teacher and student is close and informal, reflecting the atmosphere of the west, but caused in part by the small classes. With sixty-seven teaching members on the faculty, Nevada has a larger proportion of instructors to students than most other universities or colleges in the Pacific region. The academic rank of the faculty may be judged from "Who's Who in America," which lists more University of Nevada teachers in consideration of the size of instructional staff than it does for almost any other institution in the Pacific coast area.

The University is not entirely concerned with the education of youth. It serves the State as a whole. Six public service divisions are operated by the institution: The Nevada Agricultural Experiment Station, the Agricultural Extension Division, the State Mining Laboratory, the State Hygienic Laboratory, the Laboratory for Pure Food and Drugs and Weights and Measures, and the State Veterinary Control service. Each of these, as its name implies, offers the facilities of the University to those not in attendance at it.

This is the university today; 50 years ago it was a university in name only.

The pioneers who followed the covered wagons across the mountains and desert to build their homes in the fertile valleys of Nevada and to dig gold and silver from its mountains had high ideals of education. And from the beginning they have kept the educational standard in all fields in the State near the top.

When in 1864, the state constitution was drafted, provision was made for the establishment of a state university. The rapid development of mining in Nevada during the next years, kept the thoughts of the citizens of the new State on other things, until in 1874, when the university was chartered and actual work begun in Elko, a small city on the old Overland Trail in the north-central portion of the State. Although bearing the designation "university" the new institution was merely a preparatory school. Elementary courses in mining, from which has grown the Mackay School of Mines, were offered this small group of students, together with some other subjects of high school grade. The first university campus was a veritable desert. For twelve years the quality and diversity of the preparatory courses increased.

Then, in 1886, the people of the State, finding that the population was centered in the western part of Nevada, moved the school to Reno, the metropolis. With the new location, the university work proper began. Gradually higher education courses were introduced until, eventually the preparatory department was abolished and the University really lived up to its name. The transformation was brought about mainly through the efforts of President Joseph E. Stubbs, former president of Baldwin University, Berea, O., who guided the steps of the school for two decades.

But it is under the present president, Dr. Walter E. Clark, formerly head of the department of political science in the College of the City of New York, that the greatest advancement has come. When Dr. Clark became head of the University in 1917, the enrollment was about 300, a figure which had not grown during the preceding decade; today it is nearly triple that number. With this increase in numbers has come an even more important improvement in the curriculum and in university standards, until today the University of Nevada is in every respect an institution of the first rank. The campus has been beautified even more and several new buildings and much equipment have been added.

The greatest benefactors of the institution have been Clarence H. Mackay, president of the Postal Telegraph and Cable Company, and his mother, Mrs. John W. Mackay of New York. Through them wealth mined in the great Comstock Lode at Virginia City, Nev., by Mrs. Mackay's husband has been returned to the State to aid in the education of its youth.

Telegraphers Strike

THE "higher" telegraph and postal staffs struck work at Lisbon on May 10th. The Government forcibly ejected the strikers on account of alleged sabotage and closed the offices; subordinate officials and army officials were placed in charge to prevent the services being interrupted.

THREE Danish operators employed by the Great Northern, arrived in Copenhagen recently, after a trip of 17,000 miles from Shanghai, China, in a craft 45 feet long and of 27 net tons. The trip took a year and two months and was made via Manila, Batavia, Cape Town and St. Helena.

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CONTENTS

PAGE

A Digest of Changes Between the 1921 and 1924 Tax Laws. By H. Archibald Harris. 292

Radio on the Pennsylvania Railroad System 293

Siemens Recovery. 294

Report of the Board of Directors of the New York Telephone Company..... 295

Broadcasting System for Chile Proposed. Crain's Market Date Book and Directory. 297

He Linked the Lines Together. By Hon. Richard E. Enright..... 298

The Application of Radio Engineering Principles to Submarine Telegraph Cables. By Major General Geo. O. Squier. (Contined from page 286, June 16th Issue.)..... 301

Primary and Secondary Cells..... 302

James E. Hayes. New Radio Station in Eastern Czechoslovakia..... 303

Editorial Comment—Convention Open Under 13,500 flags. Telegraph and Telephone Life Insurance Association. Denmark Establishes Radio Stations in Greenland..... 304

Canadian National Telegraphs. All America Cables..... 307

Courtesy of the Air. By Roger H. Bryant..... 308

The Convention of 1868. Storage Batteries. Coming Conventions..... 310
Personal. Postal Telegraph-Cable Company. Commercial Cable Company.

Telephone and Telegraph in Chile..... 311

Western Union Telegraph Company..... 312

Honor Inventor of Typewriter..... 313

Automatic Telephones. 314

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A Digest of Changes Between the 1921 and 1924 Tax Laws

By H. Archibald Harris
Certified Public Accountant

"The following digest has been compiled by W.B. Swindell, Jr., Economist, and Bertha M. Holmes, Washington Manager, both of the staff of Archibald Harris and Company, under the direct supervision of Mr. Harris. Archibald Harris and Company are Counselors on Accounting and Taxation for the Illinois, Indiana and Tennessee Bankers Associations. They also advise a number of industrial and professional organizations on accounting and tax matters."

Income Tax changes are shown first because they affect most people and concerns, and are classified under "General," "Individual," "Corporations" and "Estates and Trusts." "General" covers changes applying to *both corporations and individuals.*

The Gift Tax, the Estate Tax and the Miscellaneous Taxes are all covered separately, under their own headings.

Sections used after paragraphs are sections of the new 1924 law, except where otherwise stated.

In order to be brief only bare changes have been shown, with very little comment.

Administrative Provisions

If tax not more that $10.00 may be signed before two witnesses instead of under oath.—Section 1002 (c).

Collector may not grant thirty days extension for filing income tax return.—Section 1003.

Request for extensions of time for filing returns must be made before the time fixed by law for filing the return.

Assessment and Collection of Tax—Period of Limitation

Taxes for 1921 and subsequent years must be assessed within four years after return filed. No suit after such four years except in case of fraud.—Section 277 (a) (1).

Tax upon income received during life of a decedent shall be *assessed* and any *proceeding in court* for its collection shall be begun within one year after written request therefor (filed after the return is made) by the person representing the estate.—Section 277 (2).

The period of Limitation may be extended sixty days for assessment of a deficiency if taxpayer does not file appeal with the Board of Tax Appeals or if appeals has been filed, the extension shall be the number of days between the date of the mailing of the notice and the date of final decision by the Board.—Section 277 (c).

Assessment and Final Determination

If tax has been paid *without protest* or abatement, credit or refund has been accepted and written agreement has been made between the Commissioner and the taxpayer, case shall be closed and not reopened even by suit, excepting in case of fraud or misrepresentation.—Section 1006 (a).

Board of Tax Appeals

Board consists of seven members (for two years after enactment of Act there may be as many as twenty-eight, in the discretion of the President.)

Members shall be appointed by the President with advice and consent of Senate.

Terms of all members during first two years shall expire at end of that period.

Salary of members, $7,500.

Hearings before the Board shall be open to the public.

Findings in every case shall be made in writing and shall be published and sold in the same manner as any other public document. A copy shall be furnished the taxpayer.

If the tax in controversy is more than $10,000, the oral testimony shall be reduced to writing and a written opinion shall be given in addition to the finding of facts and the decision.—Section 900.

Claims in Abatement

If a deficiency has been assessed without notice or within 60 days after notice or before the Board has reached decision even though the taxpayer has appealed, then abatement claim may be filed. Bond in twice the amount of the assessment shall be furnished. Commissioner shall by registered mail notify taxpayer of decision on the claim. Taxpayer has sixty days in which to appeal to Board of Tax Appeals. Amount disallowed is collectible on notice and demand. Court proceedings for amount allowed may be begun within one year even though time limit may have expired. Interest 6% on amount disallowed from original notice after final decision, thereafter 12% until paid, except in case of estates of incompetent, deceased or insolvent person, rate is 6%.

No abatement claim may be filed except in the three cases above mentioned.—Section 279.

Credit for Taxes

Same as for 1921 *except* that the credit may, at the option of the taxpayer and irrespective of the method of accounting employed, be taken in the year in which the foreign taxes accrued; subject, however, to proper adjustment when the tax is finally paid. If taxpayer adopts this basis for claiming the credit, all future years must be handled in same manner.—Section 222 (c) and 238 (c).

Dates on Which Tax Shall be Paid

Commissioner may grant extension of time for payment of the tax or any installment not to exceed six months.—Section 270 (c) (1).

If extension for payment granted, interest at 6% shall run from original due date of the tax or the installment to date of payment.—Section 270 (c) (2).

No extension possible for payment of tax withheld at source.—Section 270 (d).

Deductions

No loss is allowed on a sale of stock or securities where within thirty days before or after the sale substantially identical property was purchased or

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contracted for. New Act does not say sale must be after passage of this act as in 1921 Act.

Deficiency in Tax

Taxpayer has sixty days in which to appeal to Board of Tax Appeal instead of thirty days as in 1921 Act.—Section 274 (a).

After appeal is considered by Board of Appeals, assessment shall be made and tax shall be paid on notice and demand. Assessment shall not be made of any part of a deficiency found by the Commissioner but disallowed by the Board. But, suit may be started without assessment. Court shall allow interest at 6%. Such suits shall be begun within one year after final decision of the Board.—Section 274 (b).

If no appeal is filed in the sixty day period the deficiency shall be assessed and shall be payable upon notice and demand.—Section 274 (c).

If Commissioner believes delay dangerous, he shall assess the deficiency immediately. In such case, assessment may be made without notice or before the sixty day period has expired or before final decision of the Board. If such assessment is made and no claim in abatement is filed the deficiency shall be paid upon notice and demand.—Section 274 (d).

If deficiency not paid in accordance with terms of extension, interest at 1% a month shall run from the time the tax was due under the extension to its payment.—Section 274 (g).

No 1% a month interest for negligence as in 1921. Only 5% flat.—Section 275 (a).

Delinquency—Additions to the Tax in Case of—

Where tax *computed by the taxpayer* is not paid at prescribed time it bears interest at 1% a month instead of 5% plus 1% a month from notice and demand as under 1921.—Section 276 (a) (1).

If extension of time for payment is granted and tax or interest thereon is not paid in full before the expiration of the extension then, instead of 6% interest shall be 12%.—Section 276 (a) (2).

Where a *deficiency* or *interest* or *penalties* are not paid within ten days after notice and demand, interest runs at 1% a month from time of the notice and demand. (No 5% as in 1921.) If deficiency allocated to installments is not paid when installment is due, interest runs from date of installment.—Section (5). 276 (b).

Estate of incompetents, deceased or insolvent persons shall pay interest at 6% in lieu of 12%.—Section 276 (c).

If claim in abatement is filed interest provided by Section 276 shall not apply.—Section 276 (d).

Dividends—Liquidating

In case a corporation pays a partial liquidating dividend it shall not claim that its earnings were taken up by the nontaxable part of such liquidating dividends, and reduced for the purpose of determining the taxability of future distribution of the company.

Amounts distributed in partial liquidation are defined as a distribution by a corporation in complete cancellation or redemption of a part of its stock or one of a series of distributions in complete cancellation or redemption of all or a portion of its stock.—Section 201 (g).

(To Be Continued.)

Radio on the Pennsylvania Railroad System

EXTENSIVE tests, to determine the availability of the radio telegraph for transmitting railroad messages, other than train orders, in the event of extensive prostration of the wire systems, have just been conducted through cooperation between members of the American Radio Relay League, operating under Federal Licenses, and the Pennsylvania Railroad System management.

The tests, which covered the principal operating points on the Pennsylvania Railroad System between the Atlantic Seaboard on the east, and the Mississippi River on the west, proved in the main highly successful and, in the opinion of the railroad management, demonstrate that the service of the radio telegraph stations embraced in the League offers a practical means of emergency communication.

Before commencing the series of tests, conferences were held at Philadelphia between A. L. Budlong of Hartford, Conn., officially representing the American Radio Relay League: J. C. Johnson, General Superintendent of Telegraph of the Pennsylvania Railroad System, and the Superintendents of Telegraph and Signals of each of the four Regions in the System, namely, J. D. Jones of Philadelphia, Eastern Region; W. M. Post of Pittsburgh, Central Region; C. W. Hixson of Chicago, Northwestern Region; and E. B. Pry of St. Louis, Southwestern Region. In these conferences the methods of operating and the general plan for dispatching messages and receiving replies were agreed upon.

For each an originating station in the League was selected to send out all of the messages for the Region and receive the replies. Those designated were as follows:

Eastern Region—C. W. Lummis, 2832 Kansas Road, Camden, N. J. Station Call 3-OE.

Central Region—F. B. Westervelt, 5306 Westminster Place, Pittsburgh, Pa. Station Call 8-V2.

Northwestern Region—W. E. Schweitzer, 4264 Hazel Avenue, Chicago, Ill. Station Call 9-AAW.

Southwestern Region—C. W. Klenk, 3148 Halliday Avenue, St. Louis, Mo. Station Call 9-AAV and H. J. Becker, 4419-A Michigan Avenue, St. Louis, Mo. Station Call 9-PW.

The messages were all transmitted between 11.30 P. M. and 7.30 A. M., Eastern Standard Time. (10.30 P. M. and 6.30 A. M. Central Standard Time.)

In each Region, divisional or general divisional points on the Railroad were selected as the places to which messages should be sent from the headquarters of the Region and from which replies would be awaited. For the various Regions these points were as follows:

Eastern Region—From Regional headquarters at Philadelphia to Harrisburg, Pa.; Altoona, Pa.; Williamsport, Pa.; Sunbury, Pa.; Elmira, N. Y.; Reading, Pa.; Atlantic City, N. J.

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Central Region—From Regional headquarters at Pittsburgh to Altoona, Pa.; Buffalo, N. Y.; Oil City, Pa.; Cleveland, Ohio.

Northwestern Region—From Regional headquarters at Chicago to Ft. Wayne, Ind.; Grand Rapids, Ind.; Detroit, Mich.; Logansport, Ind.; Crestline, Ohio; Toledo, Ohio.

Southwestern Region—From Regional headquarters at St. Louis to Terre Haute, Ind.; Indianapolis, Ind.; Columbus, Ohio; Cincinnati, Ohio; Richmond, Ind.

At each receiving point a radio telegraph station was designated by the American Radio Relay League, to receive the messages, and an employee or officer was designated by the Pennsylvania Railroad Company as the person to whom the messages should be delivered and from whom the reply should be awaited.

The messages themselves, while not in the form of railroad orders, dealt with facts such as would ordinarily form the subject matter of such messages. For instance, a communication from Philadelphia to Williamsport, after giving the condition of the weather at Philadelphia, stated: "In replying to this message quote paragraph 166, page 60, Williamsport Division timetable No. 6 of April 27."

The reply quoted the text of the employees' timetable correctly, as follows: "Train BF-11 will take water at Y.O. instead of at Sunbury Passenger Station."

While the greater number of the messages were between points in the same Region, the tests demonstrated the feasibility of transmitting messages from one Region to another and from the most remote points on the lines to general System headquarters at Philadelphia. In making these tests several intermediate or relay points were introduced for the purpose of determining whether accuracy could be maintained. The results were decidely favorable.

J. C. Johnson, general superintendent of telegraph, expressed himself as being very much gratified with the results of the emergency radio service tests, which demonstrated that, in emergencies, these stations provide a means of getting general information to various points on the Pennsylvania System as well as enabling distant points on the System to communicate with the Regional or System headquarters.

Siemens Recovery

THE accounts of Siemens Brothers and Company, covering the year 1923, issued recently, show a profit of £162,229, compared with £14,041 for the previous year. After meeting interest on and redemption of Debenture stock requiring £67,439, and providing for income tax £24,338, the net profit totalled £70,452, against a deficit for 1922 of £191,802, struck after meeting Debenture charges and income tax and paying £100,000 on account of excess profits duty. The deficit on that occasion was met by the credit balance of £334,112 brought in.

After providing for the 10 per cent. Preference dividends for eighteen months to December, 1923, and including a credit balance brought in of £127,309, there is available £152,762, which the directors propose to carry forward on account of the unsettled liability for excess profits duty. The directors state that the results of the trading for the current year up to date are satisfactory, and, if continued, as seems probable, they will be in a position to declare an interim dividend on the Ordinary shares for the current half-year. The output for the year shows a considerable increase over that for 1922, but the shops were still not working to full capacity for the greater part of the year, and only in the later months was the revival in trade fully felt.

Copies of "Submarine Telegraphy," parts one and two, printed by the American School of Correspondence, can be obtained at the office of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, at $2.00 for the two books. These two books together comprise 166 pages, and by competent authorities it is said to be the best explanation of submarine telegraphy ever printed. The matter was prepared by experts in the Western Union Telegraph Company's cable service. The subjects treated after the introduction comprise, physical factors involved, general properties; resistance; capacity, leakage; absorption; inductance; transmission of signals, telegraph codes; comparison of codes; arrival curves, general problems; artificial line of two sections; four-section artificial line; real cable with capacity uniformly distributed; earthing cable after applying battery; formation of dots or dashes or real cable; building up arrival curves; methods of overcoming distortion, use of earthing interval in dots and dashes; curbed signals; signaling condensers; magnetic shunts; shunted condensers; speed of signaling, KR law; generalized KR law; speed constant of cables; duplex cable telegraphy; general arrangement; differential duplex; bridge duplex; Muirhead double-block bridge duplex; artificial cables, Stearns, Muirhead, and Dearlove types of artificial cable; installation and adjustment of artificial cables, difficulties with artificial cables; balancing process; examples of unbalanced conditions; balancing troubles; duplex transmission; signaling apparatus, cable keys; automatic machine transmitters; perforators; receiving instruments, Thomson galvanometer; Kelvin siphon recorder; modern Muirhead recorder; Direct-writing siphon recorders; Brown drum relay; Muirhead features; economic design of cable core; cable testing, tests during manufacture; tests during laying; gold-wire relay; Heurtley magnifier; selenium magnifier; design and construction of cables, general final tests; tests on good cable; false-zero method of making resistance measurements; current-reversal method of measuring resistance; Mance's method of conductor resistance tests; capacity tests on good cables; De Sauty method for comparing capacities; direct deflection method for comparing capacities; Gott method of comparing capacities; localization of breaks and faults; break tests: Kennelly two-current break test to false zero: partial earth faults, loop tests; overlap tests. The subjects are fully illustrated.

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Report of the Board of Directors of the New Telephone Co.

To the Stockholders:

The report of the New York Telephone Company for 1922 contained a description of the territory in which it operates, the service it renders, its connection with the Bell System, and its corporate history.

As shown therein, the history of your Company is one of continued expansion, and this has been true notably of the year 1923. A striking indication of such expansion is that the net gain for the year was 203,230 telephones. The year's growth was more than the entire number of telephones served January 1st, 1902, by the companies which now constitute the New York Telephone Company. It was enough in itself to serve a city of a million inhabitants.

To connect these telephones with central offices and to make them a part of the Bell System required a much larger amount of labor and equipment than is generally recognized. In 1923 our accomplishments included the following:

New Buildings completed, 8; Existing buildings enlarged, 17; New central offices completed and opened (of which 11 are machine switching) 23; Additions to existing central offices, 241. Miles of wire added: In underground cable 1,148,610; In aerial cable, 117,063; In submarine cable, 566; Open wire, aerial, 16,182. Ducts added for underground cable equivalent to 863 miles of single duct. If the wire added were placed in cable of 200 wires, it would provide sixteen cables from New York to Buffalo. Nor do these figures completely indicate the effort involved in accomplishing our growth. As a matter of fact, 422,534 telephones were installed and 219,304 were disconnected to attain the increase of 203,230 above mentioned, and many complex changes were made in the central office connections of an even greater number of telephones in order to accommodate the growth without interruption of service.

To effect this growth and to serve the new subscribers required an increased number of employees. The total number at the end of the year was 57,508, nearly twice as many as at the end of 1918.

The property has been well maintained and is in excellent physical condition.

Telephone Development

The following table shows the changes during the past ten years in the number of telephones in some of our principal cities:

STATIONS IN SERVICE

City	12-31-13	12-31-18	12-31-22	12-31-23
New York	526,391	761,443	1,071,848	1,185,979
Buffalo	37,245	59,300	78,335	87,740
Newark	27,433	37,647	55,799	63,429
Syracuse	18,685	23,372	30,389	33,568
Albany	17,505	22,437	27,745	29,897
Jersey City	5,454	17,778	25,576	29,842
Schenectady	8,950	12,332	16,220	18,114
Utica	8,052	10,816	14,836	16,307
Binghamton	4,646	8,811	11,803	12,975
Yonkers	6,727	7,958	11,415	12,615
Troy	4,552	8,606	10,400	11,088
Elmira	3,872	8,059	9,434	10,338
Mt. Vernon	5,596	6,657	8,937	9,819
Poughkeepsie	4,480	5,709	6,898	7,323
Hoboken	3,365	5,469	6,670	7,239
Watertown	4,357	5,605	6,373	6,835
Newburgh	3,677	4,561	5,306	5,639

During these ten years, the total number of stations in service throughout the territory of the Company increased from 966,893 to 2,041,632, a gain of over 100%. In the same period the population of the same territory increased about 19%. These figures indicate how much more rapidly telephone development has increased than the population of the area we serve. They show also a general recognition that the value of telephone service is much greater than its cost to the user. If this were not so the remarkable development we have experienced in the last few years would not have taken place.

At the close of the year 96,576 telephones were served by machine switching central offices. After practical experience with these installations we find that the service they furnish is very satisfactory to telephone users. Machine switching offices are being installed solely to take care of growth or to replace manual switchboards that have served their useful life.

Meeting the Demand

The demand for service was greater in 1923 than ever before, but substantial progress has been made in reducing the number of applications deferred on account of lack of facilities. The Company's aim is to regain with all possible speed its former ability to furnish telephones promptly, but the plant extension made necessary by the unprecedented demand for service has taxed to the utmost the ability of the Company to do the construction and installation work required.

Dwelling houses have been erected at an abnormally rapid rate in many localities where hitherto there has been no telephone plant at all. Furnishing facilities in such places involves not only new central office buildings and switchboards, but also the construction of a large amount of outside plant, such as digging trenches, laying conduit and installing cables. This work requires a much longer time than building the type of dwellings that have sprung up.

Our construction program for 1924 is greater than for any previous year, and every effort to provide ample facilities is being made. By the end of this year we expect to be able to furnish service to new subscribers promptly in all but a very few localities.

The gross cost of additions to plant in 1923 was $85,267,997. We must spend as much or more in 1924. We expect to provide service for 3,000,000 stations by the end of 1928 and to handle a daily average of 14,390,000 calls.

Revenue

STATE OF NEW YORK

In the report for last year mention was made of new rates established in January by the Public Service Commission of New York and the following

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statement was made:

"The Company intends to give these new rates established by the New York Commission a fair trial, but it does not believe that they are sufficient to yield all of the operating revenue to which the Company is entitled."

Shortly after March 1, 1923, on which date the rates above referred to went into effect, actual experience thereunder demonstrated that they would not afford to the Company the return which the Commission had intended and predicted that they would yield and that owing to increasing costs of operation the proportion of net revenues to gross revenues was steadily declining. These facts were recognized by the Commission in its report to the Legislature for the year 1923. After these rates had been given a fair test by more than ten months of actual experience the Company, on or about January 23, 1924, complained to the Commission against them and asked the Commission, pending its determination upon such compaint, to authorize the Company to make a temporary increase in rates at least sufficient to make them yield the mount of return intended by the Commission. Thereafter the Company continually urged upon the Commission the necessity for expedition, and finally on April 25, 1924, being of the opinion that it had a meritorious cause of action, it commenced a suit in the United States District Court for the Southern District of New York to enjoin further enforcement of the rates and has been granted temporary and partial relief pending further action.

STATE OF NEW JERSEY

The increased costs of operation also caused the net revenues of the Company in New Jersey to diminish and made an increase in rates in that State necessary. A schedule of increased rates was filed, to be effective April 1, 1924, but these rates have been suspended by an order of the Board of Public Utility Commissioners pending investigation as to their reasonableness. Such investigation at the date of this report is being proceeded with and several hearings have already been held.

As stated in the report for last year the Company will continue to do everything proper to protect its property and its abiltiy to provide service. The law requires that the Company be permitted to earn a fair return on the value of its property devoted to the public use and it intends to press the above rate proceedings to that end.

New Headquarters Building

For several years the present headquarters building of your Company at 15 Dey Street, New York City, has been inadequate to accommodate the administrative and executive forces. As a result they have been scattered throughout the city and the need for concentration has been apparent. When the present building was last enlarged in 1904 the organization numbered only a few thousand. For reasons of efficiency and economy, therefore, a new adminstration building has been decided upon and work was begun on the foundation in June, 1923.

The structure will be 29 stories high, rising 404 feet above the street level, and will occupy the full block bounded by West, Washington, Barclay and Vesey Streets. The lower nine floors will cover the entire plot, with setbacks and courts above. Construction will be of steel and brick with cream buff face brick and limestone trimmings. The building will be thoroughly commercial in character, and in addition to quarters for administrative and business forces will also provide space for a number of new central offices which will be needed in the near future to serve the downtown section.

Foundations will be completed in the early summer of this year and it is expected that the structure will be ready for occupancy about January 1, 1926.

Service

The number of telephone calls handled over the lines of your Company at present averages more than 10,000,000 per day. Five years ago the daily average was 6,200,000 calls. As the business assumes larger proportions the work of each department becomes more complex. Despite increasing difficulties, however, it is gratifying to report that our employees are providing service in all branches of the Company with steadily improving efficiency, and the standard of service throughout the territory is on the highest plane since the war.

Public Relations

We are constantly striving to bring about a better understanding of our work and our problems and to increase the co-operation of the public. In the last year a newspaper advertising campaign was carried on showing proper and improper methods of using the telephone. Telephone lectures were heard by 31,400 persons, whereby the value of courtesy as a business asset was emphasized. More than 76,000 persons were conducted through our central offices and gained a fuller knowledge of our methods of operation. Similarly, favorable reactions were produced by demonstrations in which central office operation was explained by company operators using working parts of actual switchboard. These demonstrations were witnessed by 287,000 persons during the year.

Work of the Commercial Service Bureau, begun in 1922, has gone forward on an increasing scale. The bureau studies the business of subscribers on request and gives advice as to telephone equipment best suited to their needs. It also suggests methods by which the telephone may be increasingly used as a business aid. Such surveys were made last year for 241 individuals or organizations engaged in 115 different kinds of business. This work has proved to be a good business practice for your Company and has been an important factor in improving public good-will.

Personal

Under the Plan for Employees' Pensions, Disability Benefits and Death Benefits, payments were made in 11,186 cases. Of these 10,132 were on account of sickness, 871 for accidents and 68 for

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deaths. Eighteen new pensions were authorized. Total payments from the fund were $1,029,002. As compared with 1922 there was an increase in sickness cases, but the health educational campaign now in progress is showing good results. In accident prevention your Company stands in the forefront. Its fine work in this respect is reflected by a decrease in accidents, there being 141 less than in 1922.

First aid instruction, offered to employees outside of working hours, was extensively carried on. During the year 2,169 employees passed the necessary examination and received First Aid Certificates issued jointly by The American Red Cross and your Company. We now have 4,497 employees with a working knowledge of first aid. The practical use of this knowledge in many cases during the year benefited not only our employees but others as well, and in some instances the treatment applied resulted in the saving of lives.

Thirteen Theodore N. Vail memorial medals in bronze were awarded to employees of your Company for heroism and note-worthy service in 1923.

The Company offers its employees emblems indicating the period of their continuous service when such service reaches five years for women and ten years for men. There has been an enthusiastic response to this offer, over 13,000 service emblems having been applied for and issued.

The Directors and Officers take this opportunity to express their grateful appreciation of the spirit of service throughout our organization and the loyalty and willing cooperation of our employees.

FINANCING

There were no new issues of securities during the year. Additions to property were financed by—

1. Payments for preferred stock which had been subscribed for under an installment plan, as described in the report for 1922.

2. Sale of stocks and notes of other Bell System Telephone Companies, owned by your Company.

3. Loans from the American Telephone and Telegraph Company.

The usual financial statements are appended.

Respectfully submitted, By order of the Board of Directors,

H. F. THURBER, President.

Lightning Flashes and Electric Dashes

A BOOK made up of bright, ably written stories and sketches, telegraphic and electrical, that should find a place in the home of every telegrapher; 100 large, double-column pages; profusely illustrated; $1.00.

THE new Radio fan was having his aerial erected by a local workman and the latter asked: "Will you have the bark stripped off the pole sir? "No" said the radio fan, "I don't think so;" to which the workman replied "I think I should if I were you and then when the craze is all over, you will be able to use the pole as a flagstaff" ! !

Broadcasting System for Chile Proposed

ARRANGEMENTS are being carried out in Chile for a radio broadcasting system to embrace every town and city in the country. The syndicate known as Radio Chileno plans to erect two new stations, one in the south of the country at Temuco and the other at Antofogasta, in the nitrate zone. Their principal station at Santiago has been in operation for some eight months, but in view of the unsatisfactory results obtained with the present equipment the station will be dismantled and reequipped with modern American apparatus of the same type and power as that purcashed for the new plants. During the change-over a small 10-watt American transmitting set will be used to convey the nightly radio program to the enthusiasts in and around the capital.

Organized broadcasting was started in Chile last August, but no serious attempt was made to transmit a diversified program until a month ago when the service was greatly amplified and improved. The immediate result was an increase in the sale of equipment and parts. A number of electrical supply houses report they are now selling more sets a day than they formerly did in a week, and that the demand is for higher priced equipment. The deisire to listen in is gradually spreading to all classes of Chilean society ,so that the buying of apparatus is not confined to any limited group. The practice of erecting antennae free of cost, except for the materials involved, has enabled dealers to dispose of many receiving sets to women and others not interested in the technical features of their apparatus.

—*Commerce Reports.*

Crain's Market Data Book and Directory

THE 1924 edition of Crain's Market Data Book and Directory of Class, Trade and Technical Publications, is now ready for delivery.

This book is a contribution to reference literature. It is not only valuable as a reference work on advertising, but on the whole structure of industry. In it are facts on a hundred industries, showing many pertinent facts about each of direct value to every business man. There are facts and figures on production and consumption of industry. There are facts concerning buying habits and seasons, about types of equipment used within various industries. The whole is carefully indexed to make it readily accessible for reference purposes. Crain's Market Data Book is also of direct benefit to the business press. A book of this size, devoted to the buying structure of industry and commerce, and at the same time devoting so large a part of its space to business papers, is an impressive testimonial to the extent and importance of the business press. It must strike everyone who picks up a copy of this book that the business press is a powerful force in business life.

The book measures six and a half inches wide by nine and a quarter inches in height and contains 506 pages. The price of this work is $5.00, and copies may be obtained of Telegraph and Telephone Age, 253 Broadway, New York.

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HE LINKED THE LINES TOGETHER

Samuel F. B. Morse, One of the Outstanding Geniuses of All Times, Conferred Upon Humanity the Blessing of a Means of Quick Communication that Makes the Whole World One

By Hon. Richard E. Enright

A century and a third have passed since Samuel F. B. Morse was born in Charlestown, Massachusetts, April 27, 1791. He died in New York City on April 2, 1872. He graduated from Yale and while attending college developed a highly artistic talent, which alone would have made him famous, and later he was a student artist at the feet of that great master, Benjamin West, in London, but he was born for even greater things than to become a famous artist.

The recipient of many decorations and medals, with pictures accorded distinguished honors at the Royal Academy in England and the National Academy of Design in New York, Samuel F. B. Morse was elected the first president of the National Academy of Design in New York City in 1826. In 1835 he was appointed a professor of art and design in the University of the City of New York. Among his portraits are those of James Monroe, Chancellor Kent, Fitz-Greene Halleck, Lafayette, and many other famous paintings, several of which adorn the walls of City Hall in New York.

A many-sided genius, Professor Morse did not give his entire attention to art or scientific invention, but was profoundly interested in chemistry and especially in electro-galvanic experiments.

The idea of the electric telegraph was first conceived while he was a passenger on board the packet ship *Sully* on his way from Europe to America in 1832 and, before the close of that year, a portion of the apparatus which he had devised had been constructed in New York; but it was not until three years later that in his quarters at the University of New York, he first demonstrated his invention, now known as the telegraph, which was operated over a half-mile circuit.

The first public exhibition of the merits of his telegraph was given in 1837. He then appealed to Congress for aid and, by reason of the usual lack of recognition by his home government, he visited Europe with the hope of enlisting the interest of foreign governments in his invention. In this respect his experience has been the experience of nearly every great American inventor who like poets, seem to be without honor only in their own country.

After many bitter experiences and discouraging efforts to enlist interest and public recognition of his great discovery, he returned to New York and thence to Washington, where he struggled under serious privations during the four weary years which elapsed before he obtained Congressional aid in 1844. In that year, after he had practically yielded to despair, Congress at midnight in the last hour of its session, appropriated the meagre sum of $30,000 for an experimental line between Washington and Baltimore. After a great deal of difficulty, this line was established, and what history records as the first message, *"What hath God wrought,"* was sent from the rooms of the United States Supreme Court in the Capitol at Washington to Baltimore on May 24, 1844.

I am reliably informed that this was not, in fact, the first message; the first message, it is claimed by responsible authority, was preserved, enshrined in a suitable frame and now hangs on the walls of Butler Hall at New York University, in this form of words:

"Attention; The Universe; By Kingdoms; Right Wheel."

This message was sent over a wire which ran from one classroom to another in the old buildings on Washington Square, which was once the Home of New York University. Attached to the date and efficient transcription of the message in Butler Hall runs this legend: "First public telegram in the world sent and recorded in New York University."

From that time forth Morse's electric telegraph was an assured success, but the inventor's reward was tardy and discouraging. This brave soul was constantly involved in legal difficulties to maintain his patent right of discovery, but after long years of waiting, his tremendous services to the world were finally recognized, and the number and character of the honors bestowed upon him for scientific discovery have never been equalled in the case of any American citizen or the citizen of any other country.

The "Disciples of Morse," as the members of the telegraph fraternity are sometimes called, number among them some of the most famous citizens of this and other countries. Thomas A. Edison, the greatest inventor of our age, if not of all time, began life as a telegrapher; Andrew Carnegie, the great iron magnate, financier and philanthrophist graduated from a telegraph office on the Pennsylvania Railroad; Theodore N. Vail, Thomas T. Eckert, Thomas Lowrey, Belvidere Brooks, Melville Stone, and many other noted Americans were one-time members of the telegraph cult.

One tremendous development of the telegraph is the belt of trans-oceanic cables long since carried around the world, and it would be difficult, indeed, to estimate the tremendous service to humanity and to civilization wrought through the instantaneous commercial, social and business intercourse made possible by the facilities resulting from the great invention of Professor Morse. In the records of scientific discoveries, there is no achievement, with the possible exception of the printing press, which has brought such beneficent results as the invention of the electric telegraph.

This great discovery brought the whole world into daily, instantaneous intercourse with one another. It made possible our modern newspaper, as well as the rapid and accurate transaction of business of every

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kind and character. The great financial marts of the world have depended for their expansion and material prosperity upon the wonderful revelation of scientific truths and natural phenomenon given to the world through the inventive genius of this great man.

Many years have rolled by since this great invention, during which time it has been tremendously improved and extended, and it may claim as its children the telephone, wireless telegraph, and our modern radio, which is destined to revolutionize the business and social intercourse of the civilized world.

The safety of the traveling public on land, sea, and in the air has for many years been dependent upon the invention of Professor Morse. It has made possible the safe operation of the great transcontinental railroads. The Morse code is the alphabet of progress.

Every successful war since the birth of the telegraph has depended largely upon the military intelligence borne swifty on the wings of this invention.

It has brought the most obscure and distant hamlet into the circle of civilized society. It is a necessary equipment of every ship that sails the seven seas and wherever one may travel, whether it be to either Pole or anywhere in the broad expanse of the earth, air or sea, this great discovery enables him to remain in immediate touch with civilization, his home, his business, and his friends.

The invention of the telegraph instrument gave clue to tremendous number of electrical inventions and the electric light and the transmission of the electric current for hydro-electric power and other purposes had its first inspiration from the mind of this great genius to meet economic emergencies.

The children of his brain have done more for the development of this country than all other inventions combined, and it is fitting to express the world's debt of gratitude to the memory and achievements of this wonderful man—after a century and a third have passed.

It is strange, indeed, that the last resting place of this distinguished man has been unknown to many people, especially to many people of this city, the scene of his tremendous exploits and the city which is, in all probability, the greatest beneficiary of his wonderful achievements.

The marvelous accomplishments of Professor Samuel F. B. Morse should be recalled and recorded upon the pages of every newspaper and flashed by radio into every home on his birthday anniversary as a small tribute to the memory of the genius who made possible the modern newspaper, the prompt transmission of intelligence, news and information throughout the world.

The American people sometimes seem to forget the tremendous services of their talented sons, but, unless I am mistaken, the telegraph fraternity of this country and, I hope, of the entire world on each recurring anniversary of his natal day, pause to pay honor to this great genius who has annihilated space and pushed civilization forward many centuries in the uttermost ends of the earth.

Somewhere in Holy Writ there is an injunction "To preserve the ancient landmarks which the Lord thy God hath given thee." This is indeed an ancient landmark that should stand towering forever as one of the greatest civilizing influences of the world.

Let the legend enshrined on the walls of New York University, as being the first message transmitted by the wonderful mechanism contrived by this great man be paraphrased as a tribute to his memory: "Attention! The Universe! By Republics and Kingdoms; Right Wheel," and salute the great inventor.

"An American tour is a swift succession of banquets," gulped H. G. Wells after his last cup of coffee in America while preparing his "Outline of History" of the U. S. A. He will rate dining as a premier activity of the times.

There are dinners and dinners in New York, Boston and Washington and every city and town and hamlet in the country, given for one object or another, with a view of "getting together." Some times a very little pretense is a signal for an occasion where men and women can foregather for a feast of reason, if not literally a flow of soul. The luncheon-club-habit of the times of eating and talking together has even stimulated the banquet vogue for big events.

A dinner given in New York on April 28th, the birthday of Samuel Finley Breeze Morse, inventor of the telegraph was counted one of the most impressive banquets, with a definite object in view, in all the succession of Biltmore functions. The great ball room was ablaze with electric letters giving the first official message over the electric wires —"What Hath God Wrought." The invocation and prayer by the Bishop was an eloquent expression of gratitude to the God of nations for what Morse had wrought—and was referred to by speakers that followed, as a text of the evening.

Many eminent men familiar with the Morse code were guests of an occasion inspired by Police Commissioner R. E. Enright of New York, who was himself a telegraph operator. There was the magic key and telegraph equipment at the banquet board. It tempted the tingling fingers of the old operators for a test; Frank A. Munsey, the publisher and the scholarly John Bassett Moore the diplomat, at the left, August Hecksher at the right of Commissioner Enright, and many others who longed to dot and dash the Morse code. It was an inspiring patriotic occasion. Mabel McKinley Boer, the niece of President McKinley, sang the "Star Spangled Banner" with the fervor of patriotism in her beautiful voice while a large flag waved in the breeze of electric fans. Every guest was under the electric spell. The radio made it possible for five million people to join in this tribute. At a signal the guest arose—there was a hush—the telegraph instruments ceased

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for one minute, while the birthday of Professor Morse, the artist, poet, philospher and inventor, was honored in a silence which voiced the spirit of the Past. At that moment there was brought to mind the almost unknown spot in New York where Profesor Morse lies buried—New York with its treasure trove of historic spots, and oftentimes forgotten landmarks. What would Riverside Drive be without Grant's tomb? On Wall Street is a statue marking the spot where George Washington, the first President of the Republic, took the oath of office—and there are many other such historic places almost forgotten. The home where President Monroe, author of the Monroe Doctrine, lived and died, is to be rescued from the oblivion of a great city.

A portrait of Samuel F. B. Morse in all its poetic halo adorned the menus. The boy born near Bunker Hill had come into his own on this occasion—which is the forerunner of succeeding annual events—a fitting remembrance of the greatest inventor of his age. Out of the Morse invention comes radio, the telephone, wireless telegraphy, a multitude of electric inventions, the automobile, and a succession of modern triumphs. The electric spark was first harnessed by Morse. There would have been no Edison but for Morse. Thomas Edison, the greatest man of his age, insisted that it was a telegraph instrument that gave him the inventive impulse, and vision of electricity as a boy. Dr. Sherwell who was with Cyrus W. Field when the Atlantic cable was laid, described the stirring scene aboard the *Niagara* when the continents were first linked together and the almost measureless distance of the ocean was annihilated. A piece of the first cable was on exhibition as a souvenir. Tiny telegraph instruments were at hand for use by the honored guests. It was truly a Morse night. The music was electric. The galleries were filled with brilliantly dressed women who had come to grace the occasion and hear music and speeches which sparkled with the electric spirit of the hour.

Commissioner Enright's opening address was a classic. With the zeal of a hero worshipper he had discovered the first experimental message:

"Attention; The Universe; By Republics and Kingdoms; Right-Wheel!" Words sent from classroom to classroom in an old building in New York, are preserved in the New York University. What more stirring words for the world today?

David Sarnoff of the Radio Corporation of America honored the name of Morse as the one who established the code of the wireless of today. Augustus Thomas, the great playwright, whose sixty plays have charmed the people, arose and proclaimed Morse the creative genius of the centuries, who has produced a play "with all the world a stage." With dramatic effect he closed by repeating the first message: "Attention; The Universe; By Republics and Kingdoms; Right Wheel!" John Bassett Moore gave an historic glimpse of the scenes in Congress when Morse had his struggles. The bill had not passed on the last day of the session. Morse returned home that night in the gloom of discouragement. The opposition offered amendments to divide the proposed appropriation of thirty thousand dollars for the "study of mesmerism." It was the joke and butt of many a jibe on the floor, and passed after the clock was stopped to delay adjournment. In the morning while at breakfast the news was carried to Morse by Annie Ellsworth. At first he could not believe his ears, and as he sat down with eyes streaming with tears he uttered a prayer of thanksgiving. No wonder that the first official message "What Hath God Wrought" was in the form of a prayer of gratitude to the Infinite Creator.

Thomas Edison whose monument, the electric light, even now gleams in darkest Africa, is the light of Asia, and dispels the gloom of the Catacombs of Rome, and brightens the corners of the earth, paid his tribute to Morse and the Morse code as an alphabet eternal. Morse, the master mind, codified the language of lightning and made it as imperishable as the tablets on which the Ten Commandments were written.

The magic of memory prevailed in every moment of this momentous tribute to American inventive genius, which in later years reached out to Europe for support and appreciation. Morse stands with his pittance of an appropriation—not one penny of which was left for him—as the first inventor to receive any government support. And what an exchange for the benefits conferred upon our country and all nations of the earth!

In Europe people look up or down; in America people look straight in the eyes, on the level, but somehow in all this glory of Democracy we sometimes fail to look up at times and see the heights of genius. The tingle of an electric flash was more the means of bringing the world closer together than any other one thing since the dawn of creation. As Commissioner Enright insists: "It takes its place by the side of the printing press."

The telegraph was the carburetor of railroad construction, and it made possible control of great locomotive power on rails. With the railroads, came the demand for men who dared to span continents and develop Empires of the West; the training that measured the minutes and made it possible to distribute the comforts and necessities of life to millions who otherwise would have lived in the servitude of isolation. In the little electric spark Samuel F. B. Morse talked with the ages, annihilated space and gave the world a language universal which generations past and generations unborn will continue to communicate through the medium of Morse's imperishable contribution to the progress of the universe and the kingdoms that have turned—right wheel towards the realization of a world Democracy..

—*National Magazine, Boston*

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The Application of Radio Engineering Principles to Submarine Telegraph Cables

By Major General George O. Squier,
United States Army.

(*Continued from page 286, June 16th Issue*)

Amplification of Electron Tubes

The phenomenal development of broadcasting over great distances is made possible by the use of amplification, often in several stages, of the extremely attenuated signals of speech or music, which arrive at the receiving antenna. The electron tube, used as an amplifier, is basically responsible for permitting the handling of these complicated electromagnetic waves, attenuated almost beyond measurement. In the Key Plan, this powerful instrumentality, which has done such wonders for broadcasting, should logically take its place as one of the vital steps in the reception of long submarine cable signals. Indeed, during the last few years, efforts have been made to apply the electron tube as an amplifier to the signals received over an ocean cable, but thus far without practical success. A discussion of the reasons for this failure is beyond the limits of the present paper, but it is due in large measure to the faulty design of the alphabet itself as used at present.

Enough has been said to indicate that the cable engineering of the near future will include amplification, probably in several stages, of the sub-audio signals received. In this connection, certain preliminary experimental work has been accomplished already in the laboratory. The plan adopted employs a method of coupling the receiving circuit, containing the amplifying tubes, to the cable circuit itself which may be described as "regenerative coupling." When one attempts to couple a tube receiving circuit to the cable, either directly, inductively, or electrostatically, difficulties are experienced. A long ocean cable, with practically no inductance or leakance, and a capacity of the order of a thousand m.f. is not adapted to the usual methods of coupling applied in radio engineering. For this reason the experiments thus far conducted have coupled the cable circuit to the amplifier circuits containing the tubes, by means of an adaptation of the regular standard type of d'Arsonval moving coil now universally employed in all cable receiving instruments.

In radio telephony the advantages of loose coupling are well recognized as the energy is transferred from one circuit to another without reaction between the two circuits. In like manner the long cable circuit should be separated from the amplifying circuit by a type of coupling which will prevent reactions between the two. The method indicated above is to employ the standard d'Arsonval coil, with a second winding, so that the second coil acts as a generator of electromotive force, due to the motion of both caused by the received cable current in the first coil. It is the practice at present to have two windings on this coil, in order to use this second winding for certain corrective effects for increasing the definition of certain letters of the present alphabet, so that this type of regenerative coupling in the first instance has been tried by taking the same type of coil as now exists in cable receiving apparatus, and using the second winding as a source of electromotive force which in turn changes the potential on the grid of the tubes as indicated in the diagram. The principle involved in this type of coupling is to produce an entirely new source of electromotive force. This method of coupling enables us to use the tubes as it is designed to be used as a potential instrument. To indicate that there is no direct inductive effect between the two windings, the coil, when clamped in a fixed position, should not affect the amplifier by any current received from the cable through the first coil. Since the coil in this case is free from all so-called gear, usually carried, its inertia is reduced to a minimum and it possesses a frequency response far beyond any required at present for cable signaling. Furthermore, the sensitivity of the electron tubes to minute grid potential changes is so great that a movement of the coil, not perceptible even with a reading glass, furnishes for the imput circuit of the tube a pure signal wave, regenerated, and eliminates effectively the large group of stray high frequency disturbances which have been shown to exist in many submarine cables.

The final solution of this particular problem of amplification will be made by radio engineering methods modified to suit the low frequencies involved, and it will furnish a compact amplifying unit for the cable station which will assume a role comparable with its present importance in broadcasting.

The Bruce Cable Relay Using Electron Tubes for Contact Making

In all previous cable relays the required contacts are made by the actual closing of a metallic circuit to permit the action of a current operated device of some kind.

The Bruce type of cable relay introduces for the first time in cable practice the principle of potential contacts by using the electron tube, which is essentially a potentially operated instrument.

An important point to note, in accordance with the Key Plan, is that the relay serves to detect or rectify the output wave from the cable, and detection or rectification is an essential step in the reception of all radio messages in preparing them for final interpretation by the ear. It appears that rectification is a most desirable and important step also in preparing cable messages for reception by the eye.

To insure through working it is necessary to establish repeating stations at intermediate points. Obviously these repeated signals should be of exactly the same wave form as the initial wave transmitted. The unbalance of the duplex bridge will, to a certain extent, affect the incoming wave form. The alternating current system lends itself admirably to regeneration and retransmission in a

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simple manner.

In fact, in the case of a long chain of cables linked together, as is usual, for instance, in operating from London to Cape Town, or to Australia, with the alternating current system, each of the receiver coils of the cable magnifiers and relays become a torsional pendulum, all vibrating continuously and isochronously for dots, dashes and spaces and each delayed behind the preceding one by the time required for the particular frequency wave being transmitted to traverse the section of cable immediately preceding its station.

Printer System

Of course the desirable thing in telegraphy is to produce a final record printed on a receiving tape which is pasted directly upon a delivery blank, or better, a page printed so that the message is ready for delivery to the public as it comes from the receiving instruments.

On land lines we have such printers operated multiplex, usually upon the 5-unit code system where each letter itself transmitted requires five units of time.

Such a plan for ocean cables is inefficient for the reason that it sacrifices speed, since the average letter and its space at present requires but 3.67 units of time. It is inefficient also because, in making up the combinations of elemental signals to produce the different letters, no attempt is made to introduce the continuous alternating current principle, including the space between letters and words so that we find the same inherent difficulties in transmitting and differentiating these combinations of signals, and for the same reasons. Printer systems of this type could be improved by applying the modulated alternating current principle.

These difficulties can be completely overcome if we can cause the rectified record to operate directly a printer of the Creed type. The adaptation of this printer in this manner is now under development for ocean cable operation.

This type of rectified record has been submitted to expert operators of the Signal Corps stationed in different parts of the United States, in the Philippines and in the Hawaiian Islands.

(To be continued)

A true story from South America worthy of repetition comes via London. An electrician at a cable station had been on the roof of a section of the out-buildings repairing the telephone wires under a scorching sun. At last the job was finished and he rang up the cable station to know if all was well.

"Can you hear me all right?" he said, to which came the humorist's reply "Yes, I can hear you OK old man but your voice is reversed."

"Oh! d——m it all, I shall have to get out on that roof again."

And He Went Too, and Reversed the Wires!

Primary and Secondary Cells

An electrical battery consists of two or more connected cells which convert chemical energy into electrical energy. The cell is the unit part of the battery, but the word "battery" is sometimes used to mean one cell. The essential parts of a cell are two dissimilar electrodes, immersed in an electrolyte in a suitable jar or container. Familiar examples of electrodes are the copper and zinc plates of a simple primary cell, or the lead and lead-peroxide plates of a storage cell. The electrolyte is a water solution of certain acids, alkalies, or salts which have been found to be adapted to the purpose.

A number of different kinds of cells are in common use. These may be classified conveniently into two general groups as primary and secondary cells. The most familiar of the primary cells is the "dry cell." Secondary cells are generally spoken of as "storage cells" or "Accumulators." The distinction between primary and secondary cells is based on the character of the chemical reactions which occur in them when they are in use. Primary cells convert chemical energy into electrical energy and in so doing they become exhausted. Dry cells, which are no longer serviceable, are discarded, but some of the so-called "wet" cells may be renewed with new electrodes and electrolyte. These cells cannot be recharged by an electric current because some of the chemical reactions occurring in them are irreversible. Storage cells, on the other hand, convert chemical energy into electrical energy by reactions that are essentially reversible, that is, they may be charged by an electrical current passing through them in the opposite direction to that of their discharge. During this process, electrical energy is transformed into chemical energy, which may be used again at a later time as electrical energy. Electricity is not stored as electricity by these cells. They store chemical energy and so potentially electricity.

There are other cells, some of which are intermediate between primary and secondary cells. These are generally classed with the primary cells for practical reasons, although they may possess some of the essential characteristics of the secondary cells.

This book will be confined to the two types of storage cells which are of practical importance. These are the lead-acid cells and the nickel-iron or alkaline cells. In the former, the plates are of lead and lead oxide, immersed in an electrolyte of sulphuric acid. The nickel-iron cells consists of nickel-plated steel grids containing tubes or pockets to hold the active materials of nickel and iron oxides. The electrolyte for the nickel-iron cells is a solution of potassium hydroxide more familiarly called caustic potash.

The Grouping of Cells

For most purposes storage cells are used in groups or batteries, the number of cells and their size depending on the service required. Several different arrangements are possible, and, it is therefore desirable to arrange the cells in such a way

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as to secure the most economical service. Two factors are involved in arranging the cells; one is the voltage requirement and the other the capacity. When the cells are connected in series—that is, when the positive pole of one cell is connected to the negative pole of the next, and so on to the end of the row, the voltage of the cells is additive. Two cells in series will give twice the voltage of one cell, and five cells will give five times the voltage of one, assuming that the cells, taken individually, are of the same voltage. The capacity of a row of series-connected cells, however, is no more than the capacity of a single cell.

Cells may also be connected in parallel, by connecting like poles together. The voltage of such a group is no more than the voltage of a single cell, but the capacity of the group is equal to the sum of the capacities of the individual cells. Such an arrangement of storage cells is not commonly made, because it is better to use a single cell of the required capacity rather than a group of small ones connected in parallel.

When more than three cells are involved in a series and parallel connection, there is a choice of arrangement. The cells may be arranged in several rows connected in series, and these rows may then be connected in parallel, or they may be arranged in parallel groups which are then put in series. The voltage and capacity of either of these groups is the same, but the former is preferred for storage batteries although the latter is the best arrangement for dry cells. The paralleling of series-connected groups of storage batteries is found in cases where exceptional capacity is required, or for charging when the voltage of the charging source would not be sufficient to charge the cells if they were all connected in series.

ELECTRICAL UNITS

The following electrical units are defined for

Resistance:

The unit of resistance is the "international ohm," which is defined as the resistance offered to an unvarying electric current by a column of mercury at the temperature of melting ice, 14.4521 grams in mass, of a constant cross-sectional area and a length of 106.300 centimeters. It is commonly called the "ohm."

Current:

The unit of current is the "international ampere," which is defined as the unvarying electric current which, when passed through a solution of nitrate of silver in water, in accordance with certain specifications, deposits silver at the rate of 0.00111800 of a gram per second. The standard is the silver voltameter.

Electromotive Force:

The unit of electromotive force is the "international volt," which is derived by Ohm's law from the international ampere and ohm. Since the standard cell is a more convenient standard to use than the silver voltameter, and accurate determinations of its value have been made, the volt and the ohm are generally used to measure the ampere.

Quantity:

The unit for the quantity of electricity is the coulomb, which is equal to one ampere flowing for one second. This unit may also be called the ampere-second. Larger quantities may be measured in ampere-hours. One ampere-hour equals 3600 coulombs.

Energy:

The unit of energy is equal to the unit of quantity multiplied by the unit of electromotive force and is called, in electrochemical work, the volt-coulomb. This is the same as the watt-second. A larger unit of energy is the watt-hour.

Power:

Power is the rate of expenditure of energy. It is therefore measured in a unit which is the quotient of the unit of energy divided by the unit of time. The name of the unit of power is, therefore, the watt.—*Vinal's Storage Batteries.*

James E. Hayes

THE funeral of James E. Hayes, aged sixty-eight years, once private telegraph operator for President Rutherford B. Hayes, who died at the Soldiers Home on June 8th, was held at a mortuary chapel at No. 1007 Seventh Street, Northwest, Washington, D. C.

Mr. Hayes for five years was in the signal service of the United States on the Atlantic Coast. His wife, formerly Miss Hattie Fenwick, daughter of R. M. A. Fenwick, remembered as a painter, died twenty years ago.

Surviving Mr. Hayes are three brothers, J. H. Hayes of Washington, D. C.; R. B. Hayes, Riverdale, Md., and J. W. Hayes, Jr., St. Paul, and three sisters, Mrs. Hannah Mickle, Miss Lillie Hayes, and Mrs. H. E. Lewis, all of Washington, D. C.

Interment was at the Congressional Cemetery.

New Radio Station in Eastern Czechoslovakia

THE Ministry of Posts and Telegraphs in Czechoslovakia is now constructing a radio sending station at Kosice, in the Province of Slovakia. In addition, the Government proposes to erect two other stations in the eastern part of the country, one in the vicinity of Bratislava, the provincial capital of Slovakia, and one at Uzhorod, the provincial capital of sub-Carpathian Ruthenia.—*Commerce Reports.*

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EDITORIAL COMMENT

Convention to Open Under 13,500 Flags

MADISON SQUARE GARDEN was busy on June 20th with the hum of workmen putting the final touches to the convention preparations. Although the building was virtually ready the day before and could have been used at a pinch, there remained certain fine points of decoration to be executed and tests of apparatus to be made.

The first thing which strikes a visitor's attention is the effectiveness of the use that has been made of the American flag as the scheme of decoration. In all, 3,500 American flags of all sizes are in sight of the audience. And there will be 10,000 more about noon of the opening day.

That number of tiny flags is to be released at a signal from apertures in the ceiling when the convention is opened. They will be caught in a powerful draught from a suction fan and sustained in the air while lights play on them. The fan was tested and the workmen say it raised dust from the floor.

Three large canopy shades of light were hung in the centre of the auditorium, and for the first time the two rows of arc lights that circle the hall were seen with the amber-colored shades made for them. Four large portraits of Democratic Presidents were also hung from the ceiling. Woodrow Wilson and Thomas Jefferson flank each end of the platform, while over the spectators' side of the hall hang gigantic portraits of Grover Cleveland and Andrew Jackson.

Tests were conducted by engineers of the American Telephone and Telegraph Company for the amplifying system and radio broadcasting apparatus, which are operated from a microphone on the Chairman's desk. For more than an hour an operator spoke into the microphone. He did not care what he was saying, and when he got to reading from a newspaper an account of Mayor Hylan's difficulties over the Guggenheim park concerts, some city officials who were in the building and who heard an account of the Mayor's efforts to extricate himself from embarrassment broadcast all over the hall in stentorian tones, showed signs of nervousness. Nor did the reading of an article on how McAdoo was going to get the nomination soothe the feelings of some of the out-of-town convention men who happened to be present.

In the basement workmen of the Western Union Telegraph Company were finishing what was called by J. F. Nathan, commercial general representative of the company, the largest temporary telegraph installation that has ever been put in anywhere. The job is supplied with a 200-conductor cable, which means that that many separate wires may be used if necessary. The company will have between 270 and 300 persons on the convention service continuously. A part of the installation is multiplex devices whereby four messages in each direction may be transmitted simultaneously over one wire.

The Postal Telegraph Cable Company has completed the installation of its service, which is of generous proportions.

Graham McNamee, announcer for radio station WEAF, who will have charge of the radio broadcasting service from the convention, appeared and tested the glass-enclosed booth which has been built at the eastern end of the press section for his use.

Another important job done was the alteration of the speakers' stand to improve the radio service. Two microphones, one for general use and the other to be switched in for emergency, are set up at the centre of this stand, which is about eight feet wide.

A thoughtful radio engineer pointed out that there was plenty of room at either side of the microphones for a speaker to stand leaning over the rail to address the delegates below, in which case his voice might be lost to the radio. After a conference with George T. Mara, who has been in charge of convention arrangements for the Democratic National Committee, and Elliot Cobb, the architect who designed the convention hall, it was decided to build a railing shutting off both front corners of the stand, so that there would be nothing a speaker could do but stand in front of the microphones.

Telegraph and Telephone Life Insurance Association

ASSESSMENT Nos. 826, 827, 828 and 829 will be levied by the Telegraph and Telephone Life Insurance Association, New York, on July 1st to meet the claims arising from the deaths of M. L. White, aged fifty-six years, Marion, N. Y.; Thomas E. Martin, aged sixty-eight, Pittsfield, Mass.; D. B. Grandy, aged seventy-two, St. Louis, Mo.; G. M. Young, aged sixty-three, Alderson, Pa.; James G. Hayes, aged sixty-eight, Washington, D. C. and Charles A. Jones, aged sixty-one, Denver, Colo.

Denmark Establishes Radio Stations in Greenland

THE Finance Ministry of Denmark has recently entered into a contract with the Danish Radio Company, Ltd., for the erection of four radio stations in Greenland, to be placed at Julianshaab, Godthaab, Godhaven, and Angmagsalik. The station at Julianshaab will be the head station and will have daily connection with Reykjavik in Iceland and probably also with other European stations. The Julianshaab station will be equipped with a 5-kilowatt arch transmitter, the Godthaab and Godhaven stations with a ½-kilowatt tube sender, and the Angmagsalik station with a 1½-kilowatt transmitter. The contract provides that only Danish labor and material may be used in the erection of these stations.—*Commerce Report.*

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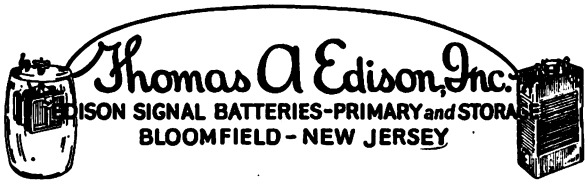

ST. LOUIS Railway Exchange Bldg. CHICAGO Peoples Gas Bldg. SAN FRANCISCO Balboa Bldg. 2022-36

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Canadian National Telegraphs

ALONE and powerless to stop a car as it started on its way down Dundas Street, London, Ont., on June 5th, three curley, white-haired children sat huddled together in the back seat unaware of the frightful danger hanging over them. Crowds passing by on the street appeared as if in a trance, until suddenly L. Newans, fifteen year-old messenger boy for this company, noting the plight of the children, dropped his wheel, hopped on the running-board of the car and steered it to the curb, bringing it to a stop.

Crowds swarmed around the children as Newans led them from the car in front of Mary's and the little tots, the oldest of whom would be no more than seven years, took her two younger brothers by the hand and said "she would wait for her mother."

No one knew them and Newans, seeing that they were being cared for, picked up his wheel and started on his way to deliver messages, as though nothing had happened.

While mothers stood around, the children could say no more than that they lived on Christie Street and that they had been left in the car while the mother went shopping.

Young Newans, who is a new addition to the ranks of the speedy messenger boys, more than deserves the praise that has been showered upon him by the people of London for his timely executed act.

All America Cables

MANAGER C. MITCHELL of Vera Cruz, Mexico, left that station for England Tension. Mr. Mitchell has served the company for over thirty years.

Manager C. Ireland of Sao Paulo, Brazil, took over the managership at Santos, Brazil, vice Manager C. H. Fletcher on furlough in the United States.

Manager A. F. Baker of Valparaiso, Chile left on furlough to be spent in England.

Assistant Manager W. J. Park of Lima, Peru, left on furlough.

Manager A. Cooper of Colon, Canal Zone, leaves on furlough to be spent in California.

THE All America Cables, Inc., announces that a concession has been obtained from the Dominican Government for the entry of its cables into Santo Domingo. They expect to be in a position to open for business in the latter part of July, and have been assured that this entry of the first American-owned and controlled cable into Santo Domingo will meet with cordial appreciation. Upon the inauguration of this service, and in conformity with All America's Policy, the Ordinary Rate will be 50c. per word and the Deferred Rate 25c. per word, a 37% reduction of the rates heretofore charged.

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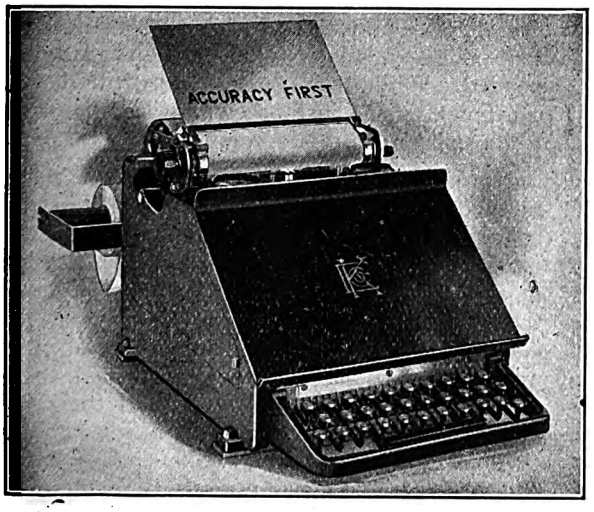

"SAY IT TO THE OTHER END IN WRITING."

Four Telegraph Typewriters enable one Railroad to move freight cars twenty-four hours earlier than before the installation was made.

These typewriters are in series on a way wire connecting freight yards, piers and general offices. Motor generators are eliminated by equipping the alternating current points with A. C. motors. All relays are eliminated and although the typewriters are connected electrically like main line sounders, no adjusting is necessary during wet weather conditions.

The machines are used continuously. During the day the messages and way-bills are taken from the machines as they are received. At night the receiving clerks go home but the machines stay "on the job to take the message." All night long they receive without human aid.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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Courtesy of the Air

By Roger H. Bryant, *Radio Engineer*
Westinghouse Electric and Manufacturing Company

You are all familiar with the expression "the rules of the game. It refers to that great accumulation of unwritten laws governing the conduct of a gentleman in any branch of sport. A man who lives up to these laws is known as "a good sport" and enjoys the respect of all who know him. Such a man would never take an unfair advantage over his opponent even when to do so might make the difference between winning and losing the game. In other words, it is the practical application of the "golden rule." We see it everywhere. At the theatre, the ladies remove their hats so that the people behind them can see more easily. At the concert, only the thoughtless ones talk or whisper during the playing of a number.

Now let us see how the rules of the game apply to radio reception. Every night several hundred broadcasting stations send out the best concert available. The expense involved in operating a broadcasting station is greater than the average man suspects. But just the same, this entertainment is free to all who possess a radio receiving set. That it is free does not alter our obligation to the other members of the audience who have just as much right to an uninterrupted enjoyment of any program they may select as we have. Unfortunately such is not the case at the present time. There are many people who are just as much annoyance to their radio neighbors as the man who keeps time with his feet is to those around him at the movies. And most of these people do not realize that they are creating a disturbance. At the organ recitals in Carnegie Music Hall, the ushers see that the members of the audience do not create a disturbance but it is seldom that one of them has to act. It would be impossible to keep as close watch over the vast radio audience but there should be no more need for it than there is in Carnegie Hall. Any of you who listen in will agree with me that the radio disturbance is many times worse than we would tolerate in a music hall. The question is, what can we do about it?

It seems to me that there are three ways in which the interference can be greatly decreased or practically eliminated. One way will occur to many people immediately and that is to legislate against the use of any receiving set that is capable of interfering when improperly operated. A second and more desirable way is to educate the operators of receiving sets and to acquaint them with their moral obligations to their neighbors. The third way is to gradually eliminate all receiving sets capable of interfering by a process of development rendering them obsolete.

I am decidedly against the first method mentioned, namely, legislation. I believe in laws and every other right minded person does, too. I divide laws into two great classes, the laws of Nature and the laws of man. Most of my time in the last ten years has been spent studying the laws of Nature. I have great respect for them because to my mind they are perfection. A certain cause always produces the same effect no matter how hard man may try to make it otherwise. One of the most marvelous things about the laws of Nature is that the number of such laws is so few. Sir Isaac Newton formulated three laws of motion and upon them are based the science of mechanics. If Nature can regulate a universe in the same manner, it would seem that a mere handful of men ought to be able to get along together with but little more. But no. Every time anything displeasing to a few arises there are those who cry "pass a law against it." Of what use is a law unless back of it there is the great force of public opinion which says, "This is for the good of all of us. I am obeying this law. You do likewise." Just how would you feel if a law were passed forbidding you to use a receiving set which was capable of interfering with your neighbor. My guess is that 95% of you listening to-night would be affected by such a law and that 95% of those affected would feel that their rights were being interfered with. So I say, let us have no more laws than are absolutely necessary. I want to call your attention though to the fact that the Department of Commerce has the power to deal severely with the interference problem if it sees fit. There is a paragraph in the laws governing radio communication where a penalty is provided for anyone who wilfully or maliciously interferes with the reception of signals from outside the state. So far this has not been invoked against the owners of oscillating receiving sets and we hope that it will not be necessary. Our friends in the British Isles began broadcast reception under strict regulations governing the type of apparatus which they might use. It has been interesting to us who are engaged in the radio business to note recently that these regulations have been gradually suspended. While we do not know all of the facts we can point to one instance where legislation appears to have been unsatisfactory.

Now let us turn our attention to the second method of handling the problem. This involves the education of the general public and I have been led to believe, from statements by people who know more about it than I do, that this is usually a thankless task. However, I believe that the majority of United States citizens believe in fair play and that when their attention is called to the fact that through improper operation of their receiving sets, they may be a source of much annoyance to their neighbors, they will take enough interest in things to become acquainted with their sets. Such acquaintance should lead to several desirable things. Chief among these is greater satisfaction for all concerned. Most men who own automobiles can discuss with you the relative merits of nearly every part in their cars but few men who buy radio sets

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The Switchboard Comes to Life

Zero hour approaches. Wire chief and assistants are set for the "cut-over" that will bring a new central office into being.

In the room above operators sit at the new switchboard. Two years this equipment has been building. It embodies the developments of hundreds of engineers and incorporates the scientific research of several decades. Now it is ready, tested in its parts but unused as an implement of service.

In the terminal room men stand in line before frames of myriad wires, the connections broken by tiny insulators. Midnight comes. A handkerchief is waved. The insulators are ripped from the frames. In a second the new switchboard becomes a thing alive. Without their knowledge thousands of subscribers are transferred from the old switchboard to the new. Even a chance conversation begun through the old board is continued without interruption through the new. The new exchange provides for further growth.

This cut-over of a switchboard is but one example, one of many engineering achievements that have made possible a wider and prompter use of the telephone.

To-day, in maintaining a national telephone service, the American Telephone and Telegraph Company, through its engineering and research departments, continuously makes available for its Associated Companies improvements in apparatus and in methods of operation.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

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have more than a very hazy idea of what is inside the box. Until they show the same interest in their radio sets that they do in their motor cars, they need not expect to obtain the same degree of service. I am not going to give you a lesson on the proper way in which to operate your set. The best place to obtain such information is in the instruction book that came with your set. Failing that, the manufacturer can always help you out.

Now for the third method. This is going forward at a fairly rapid rate. Nearly all the large radio manufacturing companies are building receiving apparatus which is a great improvement over anything heretofore available. Nearly all of the new designs may be called non-interfering ones in that provision is made to use at least one stage of radio frequency amplification. Use is made of a recent invention which makes it impossible for this radio frequency stage to oscillate and, therefore, the probability of interference is very remote. The tendency in the new designs is toward complication of apparatus but simplification of tuning control. The advantages gained are excellent sensitivity and selectivity, both highly desirable qualities. The only drawback is that such sets can not be built as cheaply as the simpler sets so that the outlay for equal results is somewhat greater. Until this condition can be remedied or until new developments make the simpler types obsolete, there will be a demand for cheap sets. Out of justice to the general public I think we ought to maintain a line of low priced apparatus and in return, I think that the owners thereof should feel obligated to do their best to avoid interference.

The Convention of 1868

DEAR MR. TALTAVALL:—

The gathering of the klans for the Democratic National Convention, makes my memory hark back many years.

In 1868, when the convention that nominated Seymour and Blair was held in Tammany Hall, and I think also, for part of the time, in the Academy of Music, I was working at 83 State Street in Boston, and was assigned to one, we didn't have many, of the convention wires.

Dick Hutchinson, a famous operator, even in those days, and one of the fastest senders in the country, was at the New York end. After an afternoon's work on one of the "no let up" days, Al. Donner, who was manager of the New York office, wired George F. Milliken, the Boston manager, that during a certain hour, his man Hutchinson had transmitted twenty-four hundred and some words, which the Boston man had received without breaking. This message afforded Mr. Milliken much satisfaction. He was proud of the ability of his operators, so the message was pasted, as a matter of record, in the big diary which was kept by the chief operator on his desk in front of the switchboard. Tom Savin was chief operator.

There were no typewriters in telegraph offices in 1868, everything being written with pen and ink, the press work on foolscap paper The wires were defective and when it rained, almost impossible. But, "bad wires make good operators" they say.

Many years afterward, and some twenty odd years ago, as I stepped out of the house where I was then living, at the corner of 125th Street and Madison Avenue, New York, a large funeral was passing. As I stood at the edge of the sidewalk wondering whose it could be, I recognized Mike Reyens in one of the carriages. He also saw me, so I called "who is it?" and he answered, "Dick Hutch." I took my hat off and stood in reverence while the cortege passed. My thoughts flew back then to 1868, as they do now. There were more of us old timers alive then. Many more have passed on since I took my last look at Dick Hutch.

Yours very sincerely,
J. E. WRIGHT, *New York City.*

Storage Batteries

AMONG the new books that have come to our desk during the past two weeks is "Storage Batteries" by George Wood Vinal, Physicist, Bureau of Standards, Member of the American Institute of Electrical Engineers. This book is the product of John Wiley and Sons, Inc., New York. It contains 402 pages and measures six inches wide by nine inches in length. This work summarizes the physical and chemical facts and theories about storage batteries and describes their various applications. Emphasis is laid on the scientific principles involved, without, however, permitting the text to become too technical. The physical and chemical properties of the materials used in constructing storage batteries are discussed, in so far as they relate to battery performance, and a general description of the methods of manufacture is given. Special attention is directed to the electrolyte and the role that it plays.

CONTENTS

Introduction: The Storage Battery Industry; Primary and Secondary Cells; The Grouping of Cells; Electrical Units. Materials and Methods of Construction. The Electrolyte. Theory of Reactions, Energy Transformations and Voltage. Capacity. Operation, Resistance. Efficiency. Testing Storage Batteries. Present-Day Uses for Storage Batteries.

The price is $4.50 per copy and copies may be obtained by addressing Telegraph and Telephone Age, 253 Broadway, New York.

Coming Conventions

OLD Time Telegraphers' and Historical Association, Hotel Roosevelt, New Orleans, La., October 30th, 31st and November 1st.

Telephone Pioneers of America, Chicago, October 10th and 11th.

Telegraph and Telephone Section of the American Railway Association, Hotel Frontenac, Quebec, Que., September 9th, 10th and 11th.

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PERSONAL

ELLERY W. STONE, sales manager of the radio department of the Pacific States Electric Company, San Francisco, has been chosen president of the Federal Telegraph Company in California to take the place of R. P. Schwerin whose resignation was announced on May 1st.

POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice president and general manager, and Mrs. Reynolds, are now living at the Wykagyl Country Club where they expect to remain for the Summer.

Accompanied by W. B. Dunn, secretary Edward Reynolds made a brief visit to Boston recently.

W. C. Daviet, vice president, has returned from an extended western trip during which he visited Chicago, Cincinnati, Des Moines, Indianapolis, Kansas City, Louisville, Milwaukee, Minneapolis, Omaha, Philadelphia, St. Louis, and Terre Haute. At a number of these cities the Mackay motion picture, "The Pulse of the World," was shown coincident with Mr. Daviet's visit and both patrons and employees found it most entertaining and instructive.

Mr. Daviet also addressed luncheon meetings of the Co-operative Club at Kansas City and the Chamber of Commerce at St. Louis.

J. F. Skirrow, vice president and chief engineer, is now located for the Summer at Wanamassa, N. J.

D. H. Gage, assistant engineer, is spending a couple of weeks at New Baltimore, N. Y.

All arrangements for handling the special file incidental to the Republican National Convention at Cleveland was carefully worked out so as to avoid any interference with the regular service of the Company. A separate room adjoining the main operating department at Cleveland was fitted up in order to handle the convention traffic independently. Division Engineer Simpson of Chicago, was in charge of all additional equipment while Assistant General Traffic Manager Powers of New York City, had general supervision of the handling of circuits.

General Superintendent S. H. Mudge was on the ground throughout the convention and had full charge of all activities. He was assisted by Superintendent J. Nering of Chicago, handling the commercial department and in charge of solicitation. Also Manager Vetter and staff of Cleveland. Superintendent F. W. Sprong of Cincinnati; Messrs. Pearson and Morris of Chicago; District Representative Mull of Cincinnati, and Manager Fahrendorf of Dayton; Horn of Canton; Koesters of Columbus; Hartman of Toledo; City Solicitor Karsh of Cleveland, and Martin Kain of Washington, also assisted the local staff in handling the press and correspondence. Assisting on the traffic were A. J. Ward of the general traffic manager's office; B. D. Seymour of Detroit, and J. E. Maloney of Chicago, Assisting Chief Operator Black of Cleveland. A large amount of press was filed and in such a way as to bring forth the commendation of the correspondents.

A. P. KRANSHAAR has returned from Cleveland where he assisted in handling the press matter for this company at the Republican Convention. From all reports the service was a great success.

I. Lesiner, operator on the New York-Providence local and Miss Shirley Schiff were married on June 21st.

Two new additions to the plant force are Williams and Watson.

New York City

CONGRATULATIONS of the force are extended to Margaret Beck, and Joe MacAskill on their recent marriages.

Robert Stewart, quad chief, has been confined at his home for the past several weeks on account of illness. He is reported to be improving slowly.

R. F. STEWART, aged sixty years, operator for the Postal Telegraph-Cable Company at 253 Broadway, New York, died on June 22nd.

Commercial Cable Co.

UNDER the revenue law signed by President Coolidge on June 2, the tax on cablegrams and telegrams heretofore levied are repealed, July 2.

The repeal of the tax on cablegrams means a saving of 10c on each message after July 2.

F. G. BURSTALL, superintendent of the Company's station at Canso, N. S., and H. D. Windeler, superintendent of the station at St. John's, Newfoundland, will be retired as of July 1st.

Telephone and Telegraph in Chile

VICTOR M. BERTHOLD of the American Telephone and Telegraph Company, 195 Broadway, New York, has produced a brochure of the telephone and telegraph of Chile. This brochure is a well written narrative of the telegraph and telephone in Chile, covering the years from 1851 to 1922. The contents of the book include: State Telegraph, 1851-1910; Statistics of Telegraph Companies in Chile, 1920; Statistics of State and Private Telegraph, 1912-1920; Statistics of State Telegraph, 1871-1922; Cable Service; Private Telephone Service, 1879-1923; Compania Chilena de Telefonos de Edison; La Compania de Telefonos de la Costa Occidental (The West Coast Telephone Co.) Companis Nacional de Telefonos; The Chili Telephone Company, Ltd.; Statistics of the Chili Telephone Company, Ltd., 1889 to 1922; Compania Nacional de Telefonos (Sociedad Anonima) General Telephone Development of the Republic; Statistics of Telephone Companies in Chile, 1911-1920; State Telephone Service; Appendix; Translation of 1923 Telegraph Tariff; Power of Attorney by Prof. Alexander Graham Bell to Jose D. Husbands for Letters Patent for Bell's telephone inventions, May 7th, 1880.

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THE WESTERN UNION TELEGRAPH CO.

THIS company has opened up two summer offices, one at Saranac Lake, chief operator W. H. Nyette, and the other office at Fabyans, N. H. and the chief operator is W. C. Sullivan.

Election of Officers

RE-ELECTION of officers was the only business of importance at the annual meeting of the International Telegraph Company, leased line of the Western Union Telegraph Company held in the office of the president, W. J. Knowlton, on June 3rd, at Portland, Me.

EDWARD C. GIBBONS of the Western Union Telegraph Company, New York, is the father of a son, born on June 6th.

R. H. BEHLING has been transferred from the Chicago main office to the office of Vice-President in charge of Traffic, New York, as an engineering assistant.

Sending of the News Sets a New Record

UNPRECEDENTEDLY complete arrangements for transmitting newspaper reports of the Republican National Convention were made by the Western Union Telegraph Company, which set up a completely equipped office in the basement of Public Hall, Cleveland.

News of the convention was transmitted from seventy-five different sending positions in addition to automatic circuits to San Francisco and Los Angeles. There were twenty-nine circuits set up at all times to New York City, twenty-eight to Chicago and twenty to other points in the West and South. The equipment was so arranged that additional circuits up to the number of 150 could be built up within a few minutes' notice.

Manning the wires were eighty-five operators supervised by a force of nine Western Union editors and twelve supervisors, with a staff of clerks and messengers to aid them. The convention hall office had a capacity of 700,000 words during each twenty-four-hour period, and the wires were used to capacity during the hours the convention was in session. The newspaper reports sent from the Western Union convention office were in addition to dispatches sent by individual newspapers over leased wires with sending instruments installed in the seats in the press section in the convention and from work rooms in the basement and from the Cleveland offices of the Western Union Telegraph Company. The Cleveland offices likewise were kept open day and night.

Picked operators from seven of the other large cities reinforced the regular Cleveland office staff. Officials of the company who supervised the convention arrangements included I. D. Hough, E. R. Shute, F. S. O'Connor and J. L. Finneran of New York City; C. L. Fisher, M. D. Combs, E. W. Springer and W. W. Drew of Chicago. Newcomb Carlton, President of the company, and J. J. Welch Vice President, were visitors to the convention and expressed approval of the telegraph arrangements.

S. P. Gibson of Chicago was in charge of the dispatching, and the reports have been transmitted with practically no delay due to wire trouble. Efforts to smooth the way for the transmission of dispatches have been entirely successful, due to the careful supervision and the modernness of the equipment.

Retirement of Frederick G. Lamb

IN commenting on the retirement of Fredrick G. Lamb, after a service of forty-four years with the Company, Superintendent J. S. Calvert of the Fourth District, Eastern Division submits the following appreciation:—

Frederick G. Lamb, chief clerk to District Commercial Superintendent J. S. Calvert at Philadelphia has applied for retirement on a pension to be effective July 1. He has been chief clerk to the District Superintendent at Philadelphia for exactly twenty-two years, serving under Superintendents Altberger, Sawyer and Reed prior to Superintendent Calvert's appointment. He was chief clerk to District Superintendent Dickey at Omaha, Neb., for nine years before coming to Philadelphia. This makes a total of thirty-one years as chief clerk, which is probably the longest period any chief clerk has served as such. Mr. Lamb was born in Fort Ann, Washington County, New York, sixty-one years ago. After acquiring a well rounded-out education he became interested in telegraphy and was first employed by the North Western Telegraph Company in March, 1880, more than forty-four years ago. His first appointment with this Company was as operator at Northfield, Minn., a short time later. Since then he has seen service in numerous states and cities throughout the entire country, having represented the Company in St. Paul, North Dakota, Texas, Kansas City, Portland, Junction City, Kansas, Leadville, Colo., Petaluma, Calif., San Francisco, Olympia, Wash., Aspen, Colo., and Omaha, Nebr., where he first enjoyed the position of chief under John J. Dickey in 1893. Nine years later, on July 1, 1902, Superintendent Altberger brought Mr. Lamb to Philadelphia for the position from which he is now retiring.

Unquestionably everyone in the district will miss him greatly, but in so doing none will envy him the pension he so richly deserves and so splendidly won. He has our warmest wishes for continual happiness in the future and may it bring the rewards which are his due.

I. MICHAEL, who for a short time had been performing the duties of service supervisor for Superintendent J. S. Calvert in the Fourth District, has been appointed Mr. Lamb's successor as chief clerk. Mr. Michael is in all probability one of the youngest men throughout the System to attain that title.

J. W. Reed has succeeded Mr. Michael as service supervisor in the Fourth District, having discon-

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tinued his work as district commercial agent.

M. Wile, formerly relief manager, has been appointed district commercial agent to refill the vacancy left by Mr. Reed's reassignment. Mr. Wile has had a very wide experience in commercial development work in all its phases.

THE office at Spokane, Wash. has moved from its old location in North Wall Street to the new building on Sprague Avenue, opposite Davenport.

"All the wire changes and connections have been made and are in working order," said Manager Comstock. In addition to opening the new headquarters in Sprague Avenue, the company is also opening a branch office at the same time in the Paulsen building."

During the change the employees of the commercial department also will transfer to the new quarters, formerly the Sherman-Clay building, to be known in the future as the Western Union building. The new quarters have been entirely outfitted with new equipment and the company will occupy the basement, main floor, fourth floor and half the third floor. The remainder of that floor and the second floor will be put into use as the company's business makes it necessary.

The physical work of making the transfer has been done in the new quarters by a gang of men under the direction of H. B. Hibbard, one of the company's supervising foremen of construction from the Coast headquarters at San Francisco.

No new employees will be added for the manning of the headquarters, but there will be two operators added at the branch in the Paulsen block, who will be in charge of E. E. Cheesman, former commercial agent, as branch manager. The new commercial agent has not yet been appointed.

The Company has occupied the building which it is now leaving for about twenty-five years.

ON July 1st the telegraph and telephone war tax on telegrams will be removed.

The charge is a flat levy of 10 cents on telegrams where the toll charge is 50 cents or more and 5 cents where the toll charge is under 50 cents.

The federal tax also applied on long distance telephone calls on the same basis. Elimination of these charges will work an economy for users of telegrams and telephones, as they, of course, paid the tax under the revenue rulings, effective since the war. The charges are abolished under the new revenue law passed by the last congress.

EDWARD J. FAUCETT, aged fifty-six years, manager of the Company at Dover, Delaware, died at that place on June 10th of apoplexy after an illness of two hours.

Are you a subscriber and reader of Telegraph and Telephone Age? If not, subscribe now. The price is $2.00 per year.

HONOR INVENTOR OF TYPEWRITER

Tablet Erected at Milwaukee to Christopher Latham Sholes

A MONUMENT was erected to Christopher Latham Sholes, inventor of the typewriter, "in grateful memory of one who materially aided in the world's progress," over his grave in Forest Home cemetery, Milwaukee on June 7th. Charles E. Weller, La Porte, Ind., the world's first typist; Mrs. Charles L. Fortier, Milwaukee, Mr. Sholes' daughter, and C. G. Sholes, Chicago, his son, were present.

After a short prayer by the Rev. James Ostler, Mrs. Fortier released the cloth covering the stone and revealed the tablet. The profile of the inventor appears in bas-relief on its face and the inscription dedicating the monument, "by the young men and women of America."

Mr. Weller, as the only survivor of the intimates of Sholes in the days of his first labors with the "writing machine," delivered the dedicatory address.

"His useful invention created a revolution in the conduct of correspondence in all branches of business and opened the door to honorable and lucrative employment for hundreds of thousands of young women," he said.

Sholes' invention was an achievement which Mr. Weller declared, "entitles him to equal rank with Elias Howe and Prof. Morse."

Mr. Weller's description of Sholes "as he walked the streets of this city in the early 70's" included his tall form, his flowing hair, and his unusually bright eyes, "peculiar to men of genius whose thoughts are centered in the future rather than in the petty details of the day."

Others who assisted at the dedication were Alan C. Reiley of the Remington Typewriter Company, New York; Herbert Dore, of the National Shorthand Reporters' association, the organization erecting the memorial, and J. D. Strachan, Indianapolis, Ind., who presided.

Mr. Sholes died in Malwaukee, Feb. 17, 1890. Before his death the typewriter already had become a prominent factor in the world's business. During his closing years the inventor always spoke of furthering the economic independence of women as the most important service of his machine.

Mr. Reiley broadcasted a talk on Sholes' life from the Marquette radio station on June 6th. He said:

"As early as 1839, Mr. Sholes had been editor of The Wisconsin Inquirer, published at Madison. In 1860 he moved to Milwaukee, where he first was postmaster, then commissioner of public works and later collector of customs. It was then that he conceived the idea of the typewriter."

Mr. Sholes spent his spare time in a small Milwaukee machine shop, known as Kliensteuber's endeavoring to invent a machine for the serial numbering of blank books, according to Mr. Reiley's account. Here Sholes met two other inventors, Samuel W. Soule and Carlos Glidden, who were

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impressed with the numbering device. Glidden remarked to Sholes, "Why cannot a machine be made that will print letters and words and not figures only?"

"By degrees the idea took shape and in the summer of 1837 the three inventors worked on the new enterprise. Soule became discouraged and dropped out. James Densmore, Meadville, Pa., became interested financially in the plans. After six years of effort, during which nearly thirty experimental models were built and discarded, Sholes produced a practical working model.

"In 1873, Densmore brought the final model to the attention of a manufacturer, E. Remington & Sons, then makers of guns in Ilion, N. Y. Later the same year the manufacture of the typewriter began. At Ilion, last September, the fiftieth anniversary of this historic event was celebrated."

HERE'S HOW IT STARTED

The origin of the stenographers' standby was related by Charles E. Weller, La Porte, Ind., intimate friend of the inventor of the typewriter, who was in Milwaukee for the unveiling of the monument.

"One day Sholes and I were discussing the speed of the machine," Mr. Weller said. "He told me to read something to him and he would pound it out as fast as he could.

"I picked up a newspaper and read the first lines my eye hit upon. It was a red hot campaign editorial, such as the papers used to have, and it started:

" 'Now is the time for all good men to come to the aid of their party.' "

Automatic Telephones

AUTOMATIC Telephones, an introductory treatise dealing with the fundamental principles, methods, and advantages of automatic telephony for students, telephone operators and others by F. A. Ellson, B. Sc. Hons. (Vict.) A. M. I. E. E. Engineer, G. P. O., has just been issued by Isaac Pitman and Sons. The book measures four and a quarter inches wide by six and a half inches in height.

No attempt has hitherto been made to provide in book form, an introductory treatise dealing in a simple manner with the fundamental principles, methods and advantages of automatic telephony. The present volume is, therefore, devoted to this purpose.

The field of automatic telephony is a very wide one and it is beyond the scope of this book to deal in detail with all systems.

It has been decided to fully explain the widely used system of the Automatic Telephone Manufacturing Company, and to treat the systems of the Western Electric Company, and of the Relay Automatic Telephone Company, in such a manner that the reader will be able clearly to comprehend their basic principles.

Siemens' System resembles in principle the Automatic Telephone Manufacturing Company's System, the points of difference being indicated in a special chapter.

Detailed information will be found in the larger text-books, and technical papers on the subject mentioned in the Bibliography.

Attention has been confined to the chief established systems in use today: the Lorimer Exchange at Hereford was one of the earliest installed in England, but as it is the only one of its type in that country it has not been dealt with. Similarly, owing to the fact that at the time of writing, the installation of the first exchange on the Peel Conner system is not complete, and on account of the general similarity of this system both in circuits and mechanical operation to the Automatic Telephone Manufacturing Company, its inclusion has not been considered necessary. The leading features of the Panel System of the Western Electric Company, and the Director system of the Automatic Telephone Manufacturing Company, are described briefly. The price of the book is $1.50 and contains 216 pages. Copies may be obtained from Telegraph and Telephone Age, 253 Broadway, New York.

What's in a Name?

MRS. JAMES had just moved into the neighborhood and it was her first meeting with the local sewing circle. As the conversation turned on the absent men, one of the ladies said to Mrs. James, "What does your husband do?"

"Oh!" said Mrs. James, "he is manager of a pail factory."

"Pail factory?" said the other. "Why, I didn't know we had such a factory in town. Where is it located?"

"Well" replied Mrs. James, "husband calls it a bucket shop, but I think pail factory sounds much better."

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Telegraph and Telephone Age

TELEGRAPHY - TELEPHONY - RADIO

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CONTENTS.

PAGE

The Application of Radio Engineering Principles to Submarine Telegraph Cables. By Major General George O. Squier. (Continued from page 286, July 1st Issue) 316
Honoring the Inventor of the Typewriter. By Alan C. Reilly 318
Telephone Apparatus Production in Sweden 319
The Military Telegraph in Arizona. By Chas. M. Clark 320
New Radio Station 321
Some of the Properties and the Purpose of the Filament in Your Vacuum Tube. By Dayton Ulrey 322
Globe Telegraph and Trust Company. Bronze Tablet to George Gray Ward. KGW Broadcasting 323
A Digest of Changes Between the 1921 and 1924 Tax Laws. By H. Archibald Harris. (Continued from Page 292, July 1st Issue) 324
Promotions Made in Canadian Pacific Railway Company's Telegraphs. The Origin of "S O S" 326
First Radio World's Fair. Civil War Reminiscences. By E. H. Hogshead, New Orleans, La. 327
Arlington Signals Set Clock Automatically. The First Radio Wedding. "Radiocasting," Not "Broadcasting" the Proper Word Now 328
Telegraph and Telephone Section of the American Railway Association 331
Japanese Railway Electrification Progressing 332
Personal. Postal Telegraph-Cable Company. Obituary 333
Western Union Telegraph Company 334
New Invention to Improve Broadcasted Concerts. Old Time Telegraphers' and Historical Association 336
Spanish Telephone System to be "Americanized." Radio Broadcasting to Start in Peru. Electrical Developments in Egypt. Japanese Protest Radio Franchise of United States Company. The Marconi Beam System. Automatic Telephone Control for Switzerland 337

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The Application of Radio Engineering Principles to Submarine Telegraph Cables.

By Major General George O. Squier, United States Army

(Continued from page 286, July 1st issue)

THE PRESENT CIRCUIT ARRANGEMENT FOR RECEIVING LONG CABLE SIGNALS

We note that there has been introduced across the galvanometer arm of the Wheatstone Bridge, a shunt arrangement, comprising in particular what is called a "magnetic shunt," which consists essentially of a large, low resistance inductance, made by a few turns of wire wound about a large mass of high permeability iron. There is in series in the galvanometer arm proper of the bridge the condenser, C, which usually has a capacity of about 60 m.f. This condenser also is provided with a condenser leak of about 30,000 ohms. The recorder coil, as indicated, has reached practically a standard value of 500 to 600 turns, which will approximate 500 to 600 ohms, with negligble inductance. The values of these elements are the result of long years of effort to increase the definition of the different letters of the alphabet as they appear in the incoming signals. It may be stated, in general, that the function of the magnetic shunt is two-fold. Its very large inductance, sometimes reaching the value of forty or more henrys, is employed to bring about a degree of resonance in the closed loop circuit which includes the condenser, C, ohmic resistances and recorder coil. This particular loop circuit functions, when properly adjusted, to build up by the principles of resonance the amplitude of certain letters according to the principles of electrical tuning.

As already pointed out, the present cable alphabet may be divided into certain groups of letters, which will assist us to see more clearly the very complex problem, which is presented in improving the definition of cable signals.

GROUP I, THE LETTERS A, C, K, N, R.

These five letters of the alphabet are received with maximum definition regardless of the shape of the impulses sent, e.g., whether the impulses are square-topped or otherwise. A long cable itself may therefore be said to be a most efficient electrical "filter." In the loop circuit, if the problem was to receive only this group of five letters, the engineer would know immediately how to proceed. For instance, if the receiving condenser, was set for 60 m.f., he could immediately determine what value of inductance the magnetic shunt should have at any particular speed of signaling. Of course, for these very low frequencies, the apparatus itself takes on sizes very different from those in radio, but the principles of operation are identical.

GROUP II, THE LETTERS *H, I, M, O, S.*

In this group, which also contains five letters, we find that the present cable alphabet employs individual pulses of the same polarity consecutively.

The two letters, E and T, are not included in the above groups for the technical reason that only a semi-sinus is used in each and the engineering unit is the complete cycle.

The other fourteen letters of the alphabet fall into a group which may be analyzed into an equivalent alternating current of a fundamental frequency, lying between these so that a table of the alphabet could be prepared in which each letter would be classified and described by the fundamental frequency employed in transmitting it.

The electrical loop circuit above has to receive also the third group of variable frequencies lying between one and two. This greatly complicates the engineering problem involved, and has led to a large variety of circuit arrangements, which have been worked out through the years to fit each particular individual cable, with the general plan of bringing the average legibility of all the signals up to the highest possible level. This solution is, of course, a compromise because manifestly the ideal alphabet would be one in which the legibility of all letters is the same.

On this view, it is seen that the Group II letters, namely, H, I, M, O, S, have during the half century of ocean cable working been responsible for pulling down the average traffic rate of all ocean cables to their speed level, and it would be interesting to estimate the price which the world has had to pay in all these years as a tribute to these badly designed letters.

The second function of the magnetic shunt is one of furnishing a low resistance path to earth, particularly for Group II letters, and to a lesser extent, of course, for the group of fourteen letters. Otherwise, definition would be impossible.

A study of the present cable alphabet discloses the remarkable fact, entirely independent of the method of sending individual elements, that the basic assignments of these combinations of elements to the letters themselves is not an assignment suited to the English language. To illustrate, the vowel letter "O," which in English telegraph practice stands second in order of frequency of usage by actual count of ten thousand letters, is assigned three dashes, which by the cable alphabet requires four units of time in transmission, whereas the letter "M," which in actual frequency of usage, occurs less than one-third as often as "O," is assigned only two dashes, requiring three units of time. The simple transposition of these two letters would in itself result in a saving of thousands of dollars a year to the cable companies.

THE DUPLEX BRIDGE BALANCE

At the present time, all important ocean cables are operated duplex by the Wheatstone bridge method. To give even a faint idea of the immense amount of effort and skill which has been devoted to the development of the Wheatstone bridge, to enable duplex working on ocean cables, it may be said at the outset that no theorist could have ever predicted that what is now being done daily in this direction could ever be accomplished. When we

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realize that in this method, due to the great attenuation of the signals in passing through ocean cables, the magnitude of the input signals is 15 to 20 thousand times greater than the output signals, it is easily understood why the balance becomes such a limiting factor. Although the duplex has these permanent disadvantages, necessarily inherent in the case, we are not yet ready to abandon this method. In other words, a change of plan by which cable messages would be sent all one way one on one cable and all the other way on a second cable, or at different times on the same cable, has basic advantages which must be considered in individual cases, based on the traffic situation and many other things.

In the attempts which have been made continuously to increase the speed of duplex cable operation, we are always confronted with two antagonistic factors. The more sensitive we make our receiving apparatus for the signals themselves, obviously, the more they respond also to bridge unbalance, with the result that for many years we have had a number of cable receiving instruments which possess a sensitivity far beyond any possible chance of using them. In addition, as will be referred to presently, we have recently discovered that the disturbing elements at each end of a submarine cable are far more complicated than engineers ever realized, until research with the electron tube disclosed them.

In the last analysis it is always the opening and closing of the transmitter key which produces the final kick or "jar" in the balance. This is not surprising when we remember that, from an electrical standpoint, nothing can be done to a circuit more severe than suddenly to introduce an infinite resistance into it.

However, since there is an appreciable spark or arc at the instant of opening the battery transmitter circuit, this discharge from the cable controls to a greater or lesser degree the character of the break; but the exact influence of this is not so easy to predict, for, though it is probable that the current dies away quicker with a sudden break than it does with a very slow one, which permits the arc to remain for some time, yet it is not proved certainly, for the more rapidly the break is made the faster the resistance increases, and therefore, probably, the rate of change of current, and with it the counter e. m. f., increases. An increased e. m. f. can bridge a longer gap, but a longer gap may be made in the same time that a short one is, with a less velocity at the break. So it appears that these two considerations counteract each other, and it all depends upon which has the greater influence.

This teaches us the fundamental necessity for removing from the circuit any make and break at the transmitter and substituting the smooth continuous wave form of the modulated alternating current.

With this change, as careful tests have shown, the balance of the bridge is very greatly improved, which means, of course increase of speed.

The development of the modern artificial line for simulating the conditions of the cable has required a large amount of patient and careful work, extending over a number of years. As soon as any form of break, with its consequent spark or arc, is removed from the transmitter circuit, and a continuous modulated alternating current is substituted, the artificial line can represent more faithfully the action of the current flowing in the real cable, and its construction may be simplified.

The present form of square-topped signals, when combined to make up letters and words, causes a broken and irregular form of current to enter the apex of the bridge, which precludes the possibility of measuring the ordinary quantities, such as voltage, current, impedance and phase-angle of the different arms of the bridge circuit. This is extremely unsatisfactory from an engineering standpoint, and leaves us only the method of trial and correction upon which to depend.

Since each elemental signal is earthed during one-quarter of the whole time of the signal, this means that, of necessity, the cable is entirely disconnected from the battery at both ends for a period aggregating not less than six hours a day. These six hours are required to drain the cable of superfluous electrical charge in order that the plant may operate during the remaining eighteen hours.

Historical

On September 13, 1918, by authority of the President, the State Department appointed a Technical Committee, known as the State Department Special Committee on Cables. The Committee was requested "to examine, experiment, and report upon any methods or improvements looking to increased efficiency in the operation of submarine cables, with special reference to the Trans-Pacific Cables." This committee was composed of the following distinguished scientists: Gano Dunn, Chairman, Dr. Arthur E. Kennelly, Dr. Frank B. Jewett, Members of the National Academy of Sciences, and Bancroft Gherardi, Past Vice-President of the American Institute of Electrical Engineers. Certain funds were provided by the War and Navy Departments for the use of the committee on experimental work.

Through the cooperation of the cable companies in placing the Atlantic cables at the disposal of this committee for experimental purposes, very valuable technical data was obtained, disclosing a large variety of electrical disturbances present in submarine cables which had not been suspected before. These results were made possible by the use of the electron tube as an amplifier.

Recently the American Telephone and Telegraph Company has developed a new alloy known as "permalloy" which possesses remarkable magnetic properties at low magnetizing forces which makes it particularly adaptable for use in the manufacture of submarine cables. A section of cable using this alloy has been already manufactured.

In 1922, the Signal Corps of the Army took steps to have allotted from its funds an amount sufficient to cover a fundamental investigation by the Bureau of Standards, looking to a substitute for gutta percha in the manufacture of submarine cables. This investigation is still in progress.

(To be continued)

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Honoring the Inventor of the Typewriter

RADIO LECTURE BY ALAN C. REILLY

On the Unveiling in Milwaukee of the Monument to Christopher Latham Sholes

IT is a personal pleasure and a privilege to tell you of an event commemorating a great service rendered to the world by a distinguished citizen of Wisconsin. At two o'clock on the afternoon of June 7th, a monument to Christopher Latham Sholes, inventor of the typewriter, the work of a Pittsburgh sculptor, was unveiled over his grave in Forest Home Cemetery, Milwaukee. The construction of this monument to one of America's great inventors was undertaken some years ago by the National Shorthand Reporters' Association and the necessary funds were raised by popular subscription. Among the many subscribers to this fund were a large number of the women typists of America who have made this grateful recognition of the service rendered by Sholes in opening to women the doors of business life.

Although it is now more than fifty years since Sholes produced his great invention, it is a fact of deepest historic interest that the unveiling of this monument was attended by a number of people who were intimately identified with the inventor and his work. And it is even more remarkable that among these were included the first man and the first woman who ever operated a typewriter. The original typist is Mr. Charles E. Weller of La Porte, Ind., who, for more than one reason, was a prominent figure at the dedication. Mr. Weller is one of the very few survivors of the intimate friends of Sholes and it has been mainly through his untiring efforts as Secretary and Treasurer of the Sholes Monument Commission of the National Shorthand Reporters Association that the idea of this memorial to Sholes has become a reality. Historically, his identification with Sholes is equally noteworthy. It was to his young friend, Weller, that Sholes sent his first experimental model for practical testing. This was in January, 1868, a date which clearly identifies Mr. Weller as the original typist.

The first woman typist, fore-runner of millions of her sex, was also present and unveiled the monument. She is Mrs. Charles L. Fortier of Milwaukee, daughter of the inventor, who, as Miss Lillian Sholes, operated one of her father's experimental models in 1872. Other children and descendants of Sholes to the number of about thirty were present at the ceremony.

In all the many chapters in the romance of invention there is none which surpasses in interest the story of the life and work of Christopher Latham Sholes. Born in Pennsylvania, of New England ancestry, he removed at an early age to Wisconsin, where he spent all of the remaining years of his long and active life. He soon attained prominence in Wisconsin journalism and politics, serving in the State Legislature both as Senator and Representative. As early as 1839, he had been editor of the Wisconsin Inquirer, published at Madison. In 1860 he removed to Milwaukee where he had an active career, first as Postmaster, and later as Commissioner of Public Works and Collector of Customs. He was also for some time editor of the Milwaukee Daily Sentinel and the Milwaukee News. It was in 1866, while serving as Collector of Customs for the Port of Milwaukee, that the invention of the typewriter enters the story.

Sholes was always of a mechanical bent and in this year he was at work in a little Milwaukee machine shop, known as Kleinsteuber's, endeavoring to perfect a machine for the serial numbering of blank books. Here he met two other inventors, Samuel W. Soule and Carlos Glidden, both of whom were at work on pet inventions of their own. Soule and Glidden soon became interested in Sholes' paging machine, and one day Glidden remarked, *"Why cannot such a machine be made that will write letters and words, and not figures only?"*

By degrees the idea took root, and in the summer of the following year, 1867, we find these three men their efforts in this new enterprise. It was a long distance, however, from the conception of the idea to its triumphant realization and the following years were filled with difficulties and discouragements. Soule soon became disheartened and dropped out. Sholes and Glidden continued to persevere, encouraged in their efforts by the indomitable faith of James Densmore of Meadville, Pa., who had purchased an interest in the enterprise. It was not, however, until six years of inventive effort, during which time nearly thirty experimental models were built and discarded, that Sholes finally produced what was considered a practical working model.

The next task was to find a suitable manufacturer, and with this end in view, Densmore, early in 1873, brought the final Sholes model to E. Remington & Sons, the famous gunmakers of Ilion, N. Y. The Remingtons proved receptive, a contract was made, and the manufacture of the first practical typewriter began at the Remington Works in the fall of 1873. The Fiftieth Anniversary of this historic event was celebrated at Ilion last September.

The marketing of the first typewriter, like its invention, was a task involving years of difficulty and struggle. The Remingtons soon found that they had undertaken something more than the sale of a new machine. Their real job was the sale of a new idea, that of time and labor saving, and this proved to be a slow work of education. The average person in those days could not assimilate the idea of paying $125 for a writing implement when pens could be bought for a penny. The early users also encountered some difficulties. The first machine wrote capital letters only, which was something of a drawback. Mark Twain, one of the first buyers, called the machine "a curiosity breeding little joker." There were no typists in the early days and no means for training them—so schools had to be opened for

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the purpose. It was not until 1878 that the first machine writing capitals and small letters was placed on the market. This proved to be what the public wanted, and from that time the progress of the typewriter has been steady and uninterrupted.

It would be difficult to exaggerate the influence of the typewriter, not only on modern business, but on modern life in the broadest sense. The typewriter has done more than save business time; it has stimulated business activity, and this fact explains the enormous transformation which this great agent of communication has wrought in modern business. This transformation has been universal, for the typewriter is used everywhere on earth. There are at least five million typewriters in use throughout the world, 80 per cent of which were made in the United States, and no less than 156 languages are written today on the writing machine. The typewriter is employed in business not only for correspondence, but also for every kind of form, tabular and statistical work. The complete bookkeeping machine, which is really a combined typewriter and adding machine, is one of the latest phases of this development. The portable model is carried everywhere by the traveler, and is also used for every kind of personal writing.

The writing machine has also transformed our entire modern system of commercial education. But perhaps the greatest of its achievements is the transformation it has wrought in our social order. A strong prejudice existed fifty years ago against the employment of women in business. Then the typewriter came, soon to be followed by the girl typist, who blazed the way for other women to enter every department of business life. Thus it was that economic independence was won, and out of this achievement has come every other triumph of modern feminism.

Sholes, who died in Milwaukee on February 17, 1890, lived long enough to witness the beginnings of this great movement and the knowledge of it gladdened his later years. Mrs. C. G. Sholes, his daughter-in-law, tells of a remarkable conversation she had with the inventor on his death-bed. She said to him, "Father Sholes what a wonderful thing you have done for the world!" He replied, "I don't know about the world, but I feel that I have done something for the women who have always had to work so hard. This will enable them more easily to earn a living." These closing words of Sholes show that he thought more of this achievement than of any other service rendered by his invention.

The unveiling of the Sholes Memorial is a reminder to all of us of the honor due to this modest man for the magnitude of the service which he rendered. And let us hope that these honors will not be confined to the unveiling of this monument in his own home town. The whole world owes honor to Sholes as one of its great benefactors and this honor will not be fittingly expressed until his name is inscribed beside those other immortals whose inventions are milestones in the story of human progress. Among the sixty-five great Americans now in the New York University Hall of Fame there are only five inventors—Eli Whitney, Robert Fulton, Samuel F. B. Morse, Elias Howe, and Joseph Henry. Great names truly, but do these exhaust the list of our great inventors? I believe that these five immortals, if they could speak, would supply the answer. One and all, they would be honored by the addition to their distinguished company of the name of Christopher Latham Sholes. Let us hope, in the new elections to the Hall of Fame, to be held next year, that this will be the verdict of the living, and that Sholes will be added to the roll of those great names that the whole humanity holds in grateful and everlasting memory.

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Telephone Apparatus Production in Sweden

THE report of the directors of the Allmanna Telefon a.b. L. M. Ericsson states that the stock of orders at the telephone works in Stockholm decreased during 1923 from 10,200,000 kr. to 7,100,000 kr. Orders of the value of 8,150,000 kr. were received, and manufactures for 10,860,000 kr. were delivered, of which the exports represented 8,690,000 kr., or 79.9 per cent. of the total deliveries. The supply of orders still remained below the normal. During the year the first stations for automatic telephony on the company's system were completed in Stockholm, Rotterdam, Hamar, and Kristiansund; the system had fully met expectations, and many installations were being carried out. The number of persons employed at the Stockholm works was 1,180; and the cable factory at Alvsjo delivered goods of the value of 2,040,000 kr. last year. After providing for depreciation the accounts show net profits of 2,055,000 kr., as compared with 2,267,000 kr. in 1922, and the rate of dividend is 5 per cent, as in the previous year. Concerning the subsidiary undertakings, the report mentions that the English company has paid a dividend of 10 per cent., and the Austrian one of 25,000 crowns per share. The works in Liningrad are still "nationalized," and are under the management of Soviet representatives. The Vienna company has formed a special company in Prague for Czecho-Slovakia, besides which a sales company for the East of Europe has been constituted in Vienna. The Hungarian concern has removed to new works, and has distributed 1,000 crowns per share. In the case of the French company large orders have recently been received from the French Telegraph Administration. Satisfactory progress has been made in Mexico; the Finnish company has distributed 20 per cent., and the Argentine telephone company 10 per cent.; and a company has been formed in Spain which has taken over the telephone netwoork in Valentia, while a factory is now being established in Madrid.—Electrical Review.

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The Military Telegraph in Arizona

By Charles M. Clark,
President Arizona Pioneers' Association

The writer, with four other young chaps, Will C. Barden, William E. Guild, W. E. Story and Fred C. Kelly, all of whom were Western Union telegraph operators came to Arizona in 1872 to build and operate military lines and instruct soldier operators to fill the smaller stations.

Guild went first to Stanwix (Agua Caliente), on the Gila river, and later to Florence, where he died; Barden went to Tucson, Storey to Camp Grant, Kelly to Campo, Calif., and the writer to Old Maricopa Wells stage station which was a repeating station. The three lines, from Apache via Tucson, Camp Verde via Prescott and Phoenix, and the line from San Diego, centered at Maricopa Wells. A set of button repeaters had been installed which required constant attention during office hours. After about eight months at Maricopa Wells, I was transferred to Whipple Barracks, near Prescott, as chief operator of the Arizona lines. Whipple Barracks was at that time headquarters for the department of Arizona. Gen. August V. Kautz was in command of the department, having just succeeded General George Crook (gray fox to the Apaches).

In the early days of military control in Arizona the soldiers were at a great disadvantage in chasing the hostiles, as the soldiers were new to the country and the maps then available were very inaccurate, while the Indians knew every trail and water hole in the country. Up to the introduction of the heliograph the military were forced to a stern chase in almost every outbreak, but after a few months of active scouting, learning the trails and water holes, maps were sent out from department headquarters compiled from the field notes of the various officers commanding scouting parties. The prominent peaks were charted with relation to their comparative positions, heliographers were trained, and upon the first report of an outbreak the heliograph men and their escorts were thrown out to their respective stations.

Communication was at once established between headquarters and the field forces and before many hours the war party was picked up by the heliographers and thereafter kept under surveilance until the respective detachments arrived and engaged them. From this point began the decline of the Apache reign of terror in Arizona, which was practically closed by the capture and deportation of Geronimo.

In the summer of 1874, I left Whipple Barracks with all of "I" troop of the Fifth cavalry, excepting the commissioned officers, to reconstruct the military telegraph from Prescott to Tucson, with the exception of that portion of the line from Prescott through the mountains to Peeples valley. The entire line was supported on cottonwood poles which had been cut along the streams and which for the most part had rotted at the ground line and fallen with the wire to the ground. It was continually in trouble. In construction through the mountains I used cedar and juniper and pine poles, but after reaching Peeples valley I had mesquite stubs cut six feet long setting them in the ground three feet. The cottonwood poles were then wired to the mesquite stubs thus getting a butt for each pole which would last as long under the ground as the cottonwood poles would last above ground. This was the first adaptation of the mesquite stub in telegraph construction, and Lieut. Phillip Reade, the officer in charge took great credit therefore in his next annual report to the chief signal officer of the army.

My outfit consisted of thirty-two men, a sergeant and corporal, all of them mounted, two six-mule teams, one eight-mule team and thirty pack mules, with their necessary drivers and attendants. When I had worked as far as Wickenburg the sergeant said we should have some black-smithing done on the wagons and many of the animals should be shod. I called on "Doc" Pearson, superintendent of the stage company's blacksmithing shop. But the company blacksmith, N. Herrick, later a partner of George H. N. Luhrs of Phoenix, was out along the line shoeing the stage stock. Pearson said that there should be a blacksmith among my party, and that he would weigh the stock and pay the blacksmith for his work if I could find a blacksmith in my party. The sergeant found that one of his men was a blacksmith and I put him to work. The bill for the work we had done there was $864, for which I gave Pearson a voucher.

After leaving Wickenburg, working south, I reached a point where the stage road left the valley of the Hassayampa river below the Brill ranch and established a mule camp there, with orders that the drivers and packers keep the animals under close herd on account of the Indians. I moved the construction camp out on the desert, intending to dry camp across the desert, having a team come out from the mule camp every fifth day to move camp and bring out water for camp use until we could swing a team to the station established at Agua Fria by "Lord" Darrel Duppa, and bring the camp water from that point.

One afternoon I came in from work and the cook informed me that the water barrel had sprung a leak and that there was not enough water in the camp for breakfast. As I kept a saddle horse at the construction camp for use in emergencies, I saddled up and rode up to the mule camp and told one of the drivers to go to the herd and get his team and haul a load of water for the camp that night. I filled my canteen and strapped it to my saddle and mounted for the return trip to camp, about six miles out on the desert. Reaching a point about two miles from where the road left the Hassayampa river, my horse picked up a cholla burr with his tail and in switching at the flies he shortly transferred the cholla from his tail to his flank. Immediately thereafter he transferred me from the saddle

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to the ground and away went horse, saddle and canteen.

After trying for a short time to catch him, without any success, I concluded to walk to camp and have the teamster who was coming out in the night with water send a man out from the mule camp to catch my horse in the morning. It was by this time quite dark, so that I could not see the telegraph poles where they paralleled the road a short distance to one side. As the walking was much better in the road I concluded to keep to the road, walking out to the line every once in a while so that I might not pass the new work. As it grew later and darker, I missed the line on one of my trips from the road. I probably passed under it between poles. At any rate, I walked and walked until I finally concluded the road nor telegraph line were neither of them in place. Then it occurred to me that I might have passed under the line between the poles and I turned around to walk back to the road. I finally gave it up and concluded to lie down until daylight when I could see where I was going. But I got restless and could not sleep. I got up and walked several times during the night, only to lie down again to wait until daylight. At daybreak I got up and looked for the telegraph line. I thought I could distinguish a line of poles in the distance, probably one mile away. But it did not seem to me to be in the right direction. However I walked over to where I thought I could distinguish a line of poles. After walking probably two miles and still seeing the line of telegraph poles in the distance, I concluded that what I took for telegraph poles in line were saguaro cactus of which there appeared to be millions on that desert. At any rate I was all mixed up, and had entirely lost all idea of direction, and I began to be alarmed. I walked at intervals all that day and finally on toward evening, I got out my field book and wrote my farewell note telling who I was and who my people were, with their addresses. I remember but little that occurred during the night except that every time that I got hold of myself I was on my feet walking. About morning it got cooler, and I again got hold of myself. My tongue was so swollen that I could scarcely close my mouth. I do not remember how the next few hours passed. I had made up my mind that I was gone, and that unless rescued I would perish from thirst before many hours. Just at this time I imagined I saw a man on horseback away off. I broke down an ocotilla pole and tying my handkerchief to it started wigwagging to attract his attention. I finally caught him, but evidently fearing Indians, he tacked back and forth, looking for flankers, until he got close enough to see that I was a white man, when he spurred his horse into a gallop and came up to where I was still waving my flag. He jumped off his horse and ran to me, asking me what I was doing out there in the desert afoot, and a lot of other stuff which I never did remember. I motioned to my mouth, and he ran to his horse and got what I still believe to be the smallest canteen in captivity. Taking my handkerchief from the pole he wet it from the canteen and daubed my face and tongue. Right there I went after that canteen. He finally threw me down and sat on me while he squeezed the water a drop at a time from the handkerchief on to my tongue. After what seemed hours of this work I began to feel the moisture passing from my tongue to my throat. I went after that canteen again and in the mix-up which occurred, I tore his buckskin shirt off his back, which incident, incidentally, cost me thirty good dollars at a later date. My rescuer finally threw me again and said: "You d— fool, stop fighting me and I will bring you through, but there's mighty little water left." After a bit I got cooled down and my tongue did not pain so awfully. But it was so lame I could not talk. Taking my field book, I wrote my occupation, stating that I belonged to the telephone construction camp which was working on the line along the stage road, and asked him to get me into camp. Putting me on his horse, he walked and led it. We reached my camp at about 4 o'clock in the afternoon and found the men had laid off work and were searching for me. I had been without food or water from Tuesday night to Thursday evening and at that I could only take "Pinole de trigo," and water, to hold me until the following day when I could swallow with great difficulty. My rescuer was Clark Colvig, who will be remembered by old-time Arizonians as a friend of King Woolsey, and as the man who killed the California bandit, "Chavez," at Agua Caliente and, severing his head from his body, put the head in a barley sack and jumped the stage with the sack for his baggage, going to San Diego where he collected the reward. Colvig was, in later years, farmer for the government at the San Carlos Indian agency, and on his frequent visits to Globe, where I then lived, I had the privilege of returning to him many a drink for those he gave me from his canteen on the Agua Fria desert. I have, in later years, crossed the Agua Fria desert in all directions and cannot understand how a man could lose his sense of direction. It is so well marked by the Bradshaws and White Tank mountains and Vulture peak shows so plainly that no one should lose his bearings at any point on the whole desert. But I was only a kid, new to the country. I knew absolutely nothing of woodcraft and was easily rattled. I'll tell the world that for an experience of the sort described, once is too much.

New Radio Station

RADIO communication has been established between France and her West African colony by the opening of the new radio station at Bamako.

"WELL, Reggie, what are you doing now?"

"Travelling in musical instruments. Sold a thousand yesterday."

"Good heavens, man! Pianos?"

"No. Gramophone needles."

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Some of the Properties and the Purpose of the Filament in Your Vacuum Tube

By Dayton Ulrey, Research Physicist,
Westinghouse Electric and Manufacturing Co.

Most people are familiar with some of the common facts of electricity. For example, perhaps you have noticed the peculiar behavior of the hair when combed with a hard rubber comb, and have heard, if not seen, the tiny sparks of electricity that pass between the two. This is fundamentally identical with the electricity which heats the filaments in your vacuum tubes. Each is made up of the same kind of electric particles, or electrons as they are called, and the difference in the two cases is much the same as the difference between a raindrop and a river. Both are made up of the same kind of molecules, but they manifest the energy tied up in them differently. In the same way all electrical phenomena are caused by the movements of electrons though the different phenomena may appear quite unrelated.

The electron is the smallest unit of electricity. With one exception it is the only thing in nature that cannot be broken up into smaller parts. We do not know absolutely its size and shape, but it is generally assumed to be a sphere of such size that if enough of them were laid in a row to make a line as long as the diameter of one of the hairs of your head, it would require more than seventy thousand million of them—more than seven thousand times the number of people in the United States.

In spite of the minuteness of the electrons, which is really far beyond the limit of human comprehension, the quantity of electricity associated with it has been measured so accurately that the error cannot be greater than about one part in four thousand—less than four-hundredths of one percent. This charge of the electron is, like its size, so small that a figure representing its magnitude is quite meaningless. Some idea, however, may be grasped by computing the number of electrons which are equivalent, in quantity of electricity, to that which flows through an ordinary 40 watt lamp in one second. This is found to be about two and a half quintillions—25 with 17 ciphers after it. This number is so enormous that if all the people on the earth—and there are about two billions of them—were put to the task of counting this number, and each man, woman and child counted at the rate of one electron per second for ten hours every day, it would take over seventy-five years to finish the job. This is the number of electrons flowing through the filament of a 40 watt lamp in a single second.

So much for the electron itself. We shall now consider its connections with the filament in a vacuum tube. It is now known that every atom of every element is made up partly of electrons and that, at least in metals, there are, in addition to the electrons tied up with each atom, other electrons which are free to move about. These "free" electrons, whether in a metal or outside in space always move toward a positively charged body and are repelled by a negatively charged one. A current of electricity in a wire is nothing more than the movement of these "free" electrons in the direction of a positive charge.

About thirty-four years ago Sir J. J. Thomas discovered that, although electrons could not be drawn out into space from a cold body by the attraction of a positive charge, electrons could be drawn out from a filament when it was heated. This opened the door to the interesting field of thermionics, the emission of electrons from hot bodies and a great deal of work has since been done by other physicists in determining the laws governing this phenomenon. It has been found that the emission of electrons from heated metals is quite analogous to the emission of vapors from heated liquids. The rate of evaporation from liquids is known to increase very rapidly as the temperature is raised and the same general law has been found to supply in the case of the "evaporation," if we may call it such, of electrons from hot bodies. The number of electrons emitted at any given temperature is different for every different element, just as the number of molecules of vapor evaporated at any given temperature is different for every different liquid.

Just a word need be said as to how this property of hot bodies is made use of in the vacuum tube. The plate, being connected to the positive end of the "B" battery, attracts electrons emitted from the filament so that, when the aerial is disconnected or when no signal is coming in, a continuous steady stream of electrons flows from the filament to the plate, through the phones, or transformer as the case may be, and into the battery. When a signal is coming in, each sound vibration at the transmitting station, even though there maybe 10,000 of them in one second, causes a corresponding change in the charge on the grid, which, being in the path of the electron stream influences the electron current. The grid becoming more electro-negative would obviously tend to repel the electrons set free at the surface of the filament thus reducing the number getting to the plate, while the opposite effect would be produced if the grid becomes more electro-positive. This varying current through the phones is responsible for the sounds we hear. The difference in the performance of the detector and amplifier requires a rather more detailed discussion and is beyond the scope of this subject.

The electron current required in a receiving tube while very small in comparison to the current necessary to heat the filament, is still quite large in terms of the number of electrons reaching the plate in one second. In an amplifier this number may be as high as twenty-quadrillions—20 with 15 ciphers following. In order to get this large omission from filament of convenient size, very high temperatures must be employed for most metals and this introduces other difficulties. Filaments become weak mechanically at the higher temperatures and larger currents are required from the filament battery.

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Consequently the effort has been for years to develop a material which will omit electrons in sufficient quantity at relatively low temperatures, which at the same time will possess sufficient mechanical strength to enable it to withstand the treatment to which a vacuum tube is ordinarily subjected and which will maintain those two properties throughout a long life. Much improvement has been made along this line and tubes are now supplied with filaments requiring small currents, having sufficient strength and giving sufficient electron omission at temperatures but little higher than necessary to show a dull red glow. We are, however, still not satisfied that the ultimate has been attained and investigation will be continued until we have this satisfaction. It is not improbable that we may be able to offer you in the future still more desirable filaments for electron omission.

Globe Telegraph and Trust Company

THE fifty-first ordinary general meeting of the Globe Telegraph and Trust Company, Ltd., was held on June 24th at Electra House, Moorgate, E.C., England.

Sir John Denison-Pender, G.B.E., K.C.M.G., who presided, said that the gross receipts for the past year amounted to £347,343, against £354,428 for the preceding year, and the net income was £336,281, as compared with £363,179 last year. After placing £12,000 to the reserve for contingencies, the directors recommended a final dividend of 3s per share on the Preference shares, making 6 per cent., less tax, for the year, and of 5s per share on the Ordinary shares, making a total dividend for the year of 10 per cent., leaving £49,577 to be carried forward. The decreases in revenue were from the Mackay Companies £8,869 and from the Submarine Cables' Trust £300, and other small decreases —amounting together to £106—made up the total to £9,275. Against this, receipts from investments, excluding the Mackay Companies, showed an increase of £900. Interest on "Money on deposit, etc.," exceeded that of last year by £1,290. Therefore, while the receipts had declined on the stocks mentioned by £9,275, the increases from other sources of £2,190 brought the actual decrease down to £7,035.

Owing, however, to a reduction in working expenses of £1,041, the net decrease was reduced to £6,044. During the year some Anglo-American Preferred stock had been sold, and a further 40 certificates of the Submarine Cables' Trust, held by this company, were drawn for payment last month. The money obtained had been invested in Ordinary and Preference shares of the Direct Spanish Telegraph Company and in shares of the Great Northern Telegraph Company. The investment in Five Per Cent. National War Bonds represented the money received from the Direct United States Company, less the balance of the loan raised to take up the shares allotted to this company in 1920. This year the company had again been able out of surplus dividend revenue, to put a considerable sum to reserve, which reserve to-day amounted to £90,000, after meeting the Preference and Ordinary dividends the latter having been raised from 8 per cent. to 10 per cent. in 1920. The present market value of the securities held by the company showed a surplus over the original cost of £1,858,571.

The report was unanimously adopted.

Bronze Tablet to George Gray Ward

AT the morning service, Sunday, June 22nd, there was unveiled with appropriate ceremonies at the Church of the Heavenly Rest, Forty-fifth street and Fifth avenue, by the Rev. H. B. Darlington, rector, an important memorial tablet to the memory of George Gray Ward, late vice-president and general manager of the Commercial Cable Company, New York.

The tablet, placed on the north wall of the nave, opposite the War Memorial, is true Gothic in style and was executed in heavy bronze by the Lamb Studios, in "Old Greenwich Village," New York. It has a rich background of black marble and is considered a masterpiece in its size, intricacy of detail, as well as its artistic importance.

It was designed for the children of Mr. Ward by the artist-architect Charles Rollinson Lamb and is presented to the Church of the Heavenly Rest by them, of which church he was vestryman and warden for over twenty years, as an expression of their recognition of his long years of devoted service and interest in the parish.

The inscription in high relief lettering across the face of the tablet reads as follows:

To the Glory of God
And in Loving Memory of
GEORGE GRAY WARD
June 15, 1922
Aged 77 years
Vestryman and Warden of this church 1901-1922
"They Rest from their Labours and
their Works do follow them"
Erected by his children.

K G W Broadcasting Station

THE Portland Oregonian Broadcasting Station KGW has organized an association of radio fans known as the "Keep Growing Wiser Order of Hoot Owls." The initiation of prominent people into this organization is a part of the program broadcasted from the station each Friday night at 10:30 P. M. Pacific time.

On June 20th, Division Commercial Manager C. F. Newson of General Manager M. T. Cook's office, San Francisco, was initiated as a member of the order, being given a ride on "Sweet William" the official goat, in due and ancient form.

Radio fans among the telegraph fraternity will find the 10:30 P. M. programs broadcasted from KGW quite entertaining and we would suggest that they tune in occasionally.

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A Digest of Changes Between the 1921 and 1924 Tax Laws

By H. Archibald Harris.

(*Continued from page 292, July 1st Issue.*)

Dividends—Taxable Date

The 1924 Act does not specify the date at which a dividend is taxable. This was Section 201 (e) of the 1921 Act and was put in as the result of much discussion over the old law.

Gains or Loss from Sales and Exchanges, Recognition of—

1924 Law has not the provision of the 1921 law, for cases in which property received in and exchange has no readily realizable market value.—Section 203.

No gain or loss is recognized on exchange of property held for productive use in trade or business or for investments (with same exceptions as in 1921) except that in 1924 Act if common stock in a corporation is exchanged *solely* for common stock or preferred is exchanged solely for preferred stock of same corporation no gain or no loss.—Section 203 (b) (1).

No gain or loss if *stock or securities in a corporation a party to a reorganization* are in the reorganization exchanged *soley* for stock or securities in any corporation a party to the reorganization.—Section 203 (b) (2).

(Old law provided for no gain or loss when in a reorganization a person received such stock or securities in exchange for "any stock or securities owned by him.")

No gain, no loss on transfers of property by any person or persons to a corporation *solely in exchange for stock or securities* of the corporation if same person or persons are in control immediately after the transfer (Control same as in 1921 Act.)—Section 203 (b) (4).

If property described in 203 (b) (1) (2) or (4) just above is received together with money or property of another nature, then gain is recognized but not to exceed the sum of the money and the fair market value of such other property described in 203 (b) (1) (2) or (4).—Section 203 (d) (1).

No gain to a shareholder who in a reorganization does not surrender his old stock, but receives stock or securities of any corporation a party to the reorganization.—Section 203 (c).

In all the foregoing cases of mixed property no loss shall be recognized even though a gain may be recognized.—Section 203 (f).

The new law prohibits a corporation from claiming that a distribution (*in pursuance of a plan of reorganization*) of its stock was a distribution of earnings available for future distribution and does not allow such distribution to be considered in determining the taxability of such future distributions.—Section 203. (g).

Gain or Loss, Depletion and Depreciation—Basis for Determining

If property acquired after 12/31/20 by transfer in trust (not including a trust by bequest or devise) is sold basis is same value as would have been used by grantor, proper adjustment being made for any gain or loss recognized when the transfer was made.—Section 203 (a) (3).

This value is not to be used in determining gain or loss on trust property transferred during life by an individual under such conditions as rendered the property subject to estate tax at the time of the grantor's death or on the sale of property passing under a general power of appointment by a decedent whether by will or by deed executed in contemplation of death.—Section (a) (3).

In the case of a sale of property received in exchange which would be wholly or partially exempt under this law, the basis shall be the cost or 3/1/13 value of the old property with proper adjustments for any gain or loss accounted for at the time of the exchange.—Section 204 (a) (6).

Bases are (1) cost, (2) bases outlined above or (3) March 1, 1913, value (Basis No. 2 is new.) In determining Mar. 1, 1913, value of stock due regard shall be given to the fair market value of the assets of the corporation.—Section 203 (b).

Basis for depletion, depreciation or obsolescence same as basis for determining gain or loss except that depletion in the case of mine, oil or gas wells may be in certain cases based on discovery value.—Section 204 (c).

(1921 method of determining gain or loss on sale of property owned on 3/1/13 omitted.)

Interest on Refunds and Credits

Interest at 6% to taxpayer on refunds, credits and penalties illegally assessed runs from date such tax penalty or sum *was paid* to date of refunds, or in case of credit, to due date of the amount against which the credit is allowed unless such amount is an additional assessment, then to the date of the assessment of that amount.—Section 1019.

Losses, Net

A net loss shown by a return for a fractional part of a year may be carried forward to the next year or two under 1924 law. Rulings under previous laws allowed only net losses sustained in a full twelve-month period.

It looks as if this action of Congress may lead the Treasury Department to reverse its rulings for prior years and allow net losses for a fractional part of a year.—Section 200 (a) (1).

In computing a net loss a taxpayer uses all deduction connected *with his trade or business* plus any deduction allowed on his income tax return *and not connected with his trade* or *business to the extent of gross income not derived* from such trade or business.—Section 206 (a) (1).

In determing net loss deduction for depletion shall not exceed the amount which would be allowed if computed without reference to discovery value.—Section 206 (a) (3).

"Gross income" for net loss purposes includes all tax free interest received less the amount of interest paid or accrued and losses sustained and not allowed

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as a deduction from gross income.—Section 206 (a)

Net losses for 1922 are to be handled under the 1921 Act.—Section 206 (e).

Net losses for 1923 are to be determined under 1921 Act but applied to 1924-1925 income according to 1924 Act.—Section 206 (f).

In case of a fiscal year beginning and ending in calendar years having different laws the net loss for such fiscal year shall be the sum of the proportionate part of a net loss computed under each law which corresponds to the part of the fiscal year falling in each calendar year—Section 206 (g).

Limitation on Assessments and Suits by the United States

With a few exceptions internal revenue taxes shall be assessed within four years after they become due and any suit for their collection must be brought within five years after they become due.—Section 1009 (a).

In case of fraud, or a failure to file a required return or of a willful attempt to evade tax, assessment may be made or a suit for collection may be begun without assessment, at any time.—Section 1009 (b).

Where assessment made in time suit may be begun within six years after assessment.—Section 1009 (c).

Limitations on Prosecutions

Limitation on prosecutions for defrauding or attempting to defraud the United States shall be six years.—Section 1010 (a).

Limitations for Suits and Proceedings by Taxpayers

Suit for a recovery of taxes or penalty may be brought whether or not such taxes or penalty was paid under protest or duress.—Section 1014 (a).

Any taxpayer who has been charged with fraud for any year between 1916 and 1921, both inclusive, may now reopen claim for refund or credit for any of those years which were disallowed because the taxpayer failed to come clear of the fraud charge.—Section 1015.

Penalties

Penalty for willful failure to pay or make return, $10,000 or imprisonment not more than one year or both.—Section 1017 (a).

For willful failure to collect and pay over tax or willful evasion of tax $10,000 or imprisonment not more than five years or both.—Section 1017 (b).

For willful aid or assistance in preparing false or fraudulent return affidavit or statement $10,000 or five years or both.—Section 1017 (c).

For willful failure to pay or collect or to account for and pay over any taxes (other than income, estate or gift taxes) or for willful attempt to evade payment of such taxes shall be in addition to other penalties, 100% of the tax evaded.—Section 1017 (d).

Reduction of Income Tax Payable in 1924

1923 taxes reduced 25% for *all* taxpayers, other than corporation.—Section 1200 (a).

If entire 1923 tax has been paid 25% shall be credited or refunded.—Section 1200 (b).

If tax being paid in installments the 25% shall be allocated to the four installments. The amount prorated to any installment not yet due shall be used to reduce such installment.

The amount prorated to any installment past due shall be used as a credit against the installment next falling due.—Section 1200 (c).

Provision is made for credit in case taxpayer has an extension of time for payment.—Section 1200 (d).

Provisions are also made for adjustment of deficiencies and overpayment—Section 1200 (e), (f), (g).

Credit provided for 25% of that part of fiscal year (1923 or 1924) tax applicable to calendar year 1923.—Section 1201 (a).

Twenty-five per cent credit allowed for part of year 1923 if return covers fractional part of year.—Section 1202.

Refunds and Credits

Claim must be filed within four years after *tax was paid* instead of five years after return due as in 1921. The credit or refund shall not exceed the tax paid during the four years immediately preceding the filing of the claim or if no claim was filed then during the four years immediately preceding the allowance of the credit or refund.—Section 281 (b).

If 1917 or 1918 waivers filed, claim may be filed at any time before April 1, 1925, or within four years from the time the tax was paid.—Section 281 (e).

Any claims now on file are valid and claims for 1919 or 1920 may be allowed if claim is filed before five years after return was due.—Section 281 (f).

Returns—False or Fraudulent

In case of false or fraudulent returns or failure to file a return, tax may be assessed or court action may be brought at any time.—Section 278 (a).

Any deficiency due to a change in an amortization deduction under either 1918 or 1921 Act may be assessed or a proceeding in court without assessment may be begun at any time.—Section 278 (b).

Where assessment made in time provided by law, such tax may be collected by distraint or proceeding in court begun within six years after *assessment.* Court action may be begun *with assessment* at any time before the expiration of the Statute of Limitations.—Section 278 (d).

Returns to be Made Public Records

If the Ways and Means Committee of the House, the Senate, Finance Committee or a Special Committee of either House of Congress calls upon the Secretary of the Treasury for any income tax returns it shall be his duty to give such committee all data contained in or shown by such returns.

Proper officers of a State may upon request of its governor have access to the returns of any corporation (not any other taxpayer) even though such state does not impose an income tax law.

Commissioner may add to the public list of tax-

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payers' names and addresses kept in the Collector's office the amount of tax paid by every taxpayer.

INDIVIDUALS

Capital Gains and Losses

Definition capital loss same as 1921 Act, except does not specify sale or exchange shall have been consummated since 12/31/21.

"Ordinary deductions" defined as all deductions under Section 214, except capital deductions.

Capital net gain is the excess of capital gain over sum of capital deductions and capital losses plus (a) any excess of ordinary deductions over gross income not including capital gain. (a) is new.

"Capital net loss" means the excess of the sum of the capital losses plus capital deductions over the amount of capital gains.—Section 208 (a) (5).

Under the new law it appears that property held for personal use may be "capital asset" under this section. The 1924 Act precludes property held primarily for sale in the course of the taxpayer's trade or business from being considered "capital assets." —Section 208 (a) (7).

Taxpayers other than corporations are allowed capital losses only to the extent of capital gains. Section 206 (a) (2).

(*To be continued.*)

Promotions Made in Canadian Pacific Railway Company's Telegraphs

A NUMBER of important promotions among the higher officers of the Canadian Pacific Railway Company's Telegraphs, which went into effect on July 1st, were announced by J. McMillan, the company's general manager. Under the changes, W. D. Neil, who, since 1922, has been assistant manager of telegraphs eastern lines with headquarters at Montreal, is appointed assistant manager of western lines with headquarters at Winnipeg. He will be succeeded as assistant manager, eastern lines in Montreal, by J. Mitchell, superintendent of eastern division at Montreal. The latter position will be filled by H. S. Ingram, who, up to now, has been superintendent of traffic and tariff at Winnipeg. The new superintendent of traffic and tariff at the latter center will be A. J. Clark, who since 1911 has been telegraph agent at Vancouver, while W. Marshall, who for some years has been assistant manager of telegraphs, western lines, at Winnipeg, and who previously was superintendent at Toronto, is transferred to the retired list.

W. D. Neil, who goes to Winnipeg, entered the company's service at Calgary in 1905 and became chief clerk of telegraphs in 1907. In 1910 he was transferred to be chief clerk at Winnipeg, and in 1915 was appointed traffic and tariff superintendent there. A year later he became superintendent of telegraphs at Montreal, and in 1918 assumed the same position at Toronto. In 1922 he was appointed assistant manager, eastern lines, at Montreal.

J. Mitchell, who succeeds Mr. Neil, in Montreal, entered the service at Montreal as an operator in 1886 and became chief operator in 1909. He was appointed inspector in 1910, superintendent of traffic and tariff in 1918, and superintendent of the eastern division in 1920.

H. S. Ingram joined the service as an operator in 1903 at Winnipeg and was appointed wire chief in 1911. He was appointed inspector in 1912 and a year later chief operator. In 1915 he was moved to Toronto as inspector and in 1923 returned to Winnipeg as superintendent of traffic and tariff.

A. J. Clark started as an operator at Halifax in 1896 and was transferred to Vancouver in 1910 as night chief operator and in 1911 was appointed city agent at Vancouver.

The Origin of "S. O. S."

(BY A SPECIAL CORRESPONDENT.)

So many explanations have been given in the press and elsewhere of the origin of the wireless distress signal used by ships at sea that recently the International Telegraph Bureau was requested to give the correct version as to why these three letters were chosen.

The Director of the Bureau states that the first suggestion for a distress signal for ships use was made by the Italian delegates at the preliminary conference on wireless telegraphy, held at Berlin, in 1903, when the adoption of a universal signal "SSSDDD" was urged. "S" presumably being to indicate that it was a ship calling, and "D", being the International designation for an URGENT message. All stations and ships, should be compelled to receive such calls, suspending all other communications for the time being. The other delegate agreed to the need for such a signal, but the final decision was left for the special conference later.

Shortly after this suggestion was made the Marconi Company recognized that a distress call signal was necessary and on February 1st, 1904, the famous signal "CQD" was instituted on all ships fitted with their apparatus. "CQ" being the International Telegraph sign for "all stations" while the letter "D" as already pointed out is the designation used for an "Urgent" message.

Several countries, including the United States, adopted "CQD" and used it until the Radio Telegraphic Conference in Berlin in 1906 when the German Government suggested that the standard distress signal for ships at sea should be "SOS"; previously German ships used the signal "SOE", but the last letter "E" was easily dropped as it consists of a single "dot" and was often lost in atmospheric disturbances. Finally the famous signal "SOS" was adopted officially by the International Radio Telegraphic Convention in July, 1908, although it was at the time a matter of regret to Marconi operators that their old signal "CQD" was dropped and it has now been obsolete for some years.

The "SOS" should be signalled without spaces, "...———..." and not as it is often done "... ——— ..." the Berne Bureau explains.

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First Radio World's Fair

THE First Radio World's Fair to be held in Madison Square Garden and the 69th Regiment Armory, New York City, from September 22nd to 8th, is attracting the serious attention of the radio eniuses of the world and scores of them are prearing to introduce their latest inventions at the oming exposition.

Managers U. J. Herrmann and James F. Kerr, ave been compelled to enlarge the "New Inveniions Section" to a size which will allow the exibition of one hundred devices. Among the noteworthy American discoveries to be shown will be at east three different instruments designed for the urpose of radiocasting photographs in motion. Europe will also be well represented in this departnent. Several Continental inventors will display ew inventions of a most unusual character.

Half a dozen recognized wireless engineers are ow busily engaged trying to perfect systems for adioing pictures and Messrs. Herrmann and Kerr, ave high hopes of being able to broadcast the world's first program of "Radio Motion Pictures" n the opening night of the exposition.

Sixty nationally known manufacturers of the United States will have de luxe exhibits at the big air and England, France, Belgium, Italy, Switzerand and Austria will have proper representation in he "Foreign Section." Exhibition booths of elaborate construction will fill both big buildings to which there will be but one admission charge.

The most attractive feature programs imaginable will be staged every afternoon and evening, which will include a series of almost unbelievable overseas tests in which Miss Edith Bennett, the famous young American concert star, will participate. Miss Bennett is well known to the radio enthusiasts of every land because of her now historical trans-Atlantic recital, last year, which was heard by millions of people in a hundred or more countries.

A number of the leading radio trade organizations are planning to hold their 1924 conventions in New York during the First Radio World's Fair and arrangements are now being made to conduct their business meetings in the lecture halls and demonstration auditoriums of the Armory and Garden between the hours of 9:00 and 12:00 o'clock every morning.

Fully a thousand jobbers and dealers, native and foreign, will attend the big show and two hours per day will be set aside for the exclusive transaction of business between these wholesale buyers and the exhibitors.

The International Amateur Builder's Contest is assuming such huge proportions that the show management expects this feature alone to fill the entire basement of Madison Square Garden. Blanks for this competition are being distributed by radio dealers in New York and abroad and entries are already coming in from all parts of the world. Twenty-five prizes will be awarded in this interesting contest and entry blanks with full particulars will be supplied to all who write direct to General Manager James F. Kerr, Hotel Prince George, New York City. In the Metropolitan District blanks will be obtainable at the leading radio stores.

Civil War Reminiscences

BY E. H. HOGSHEAD, *New Orleans.*

ANENT the Civil War story in the AGE of March 16th, by S. L. Robinson of Petoskey, Mich., I wish to make a few remarks: "On fortunes cap," Mr. Robinson seems not to have been even "the button," as he carries Confederate lead in his body even at this late date. I truly sympathize with him. But there are some things about Gen. J. Smith's expedition that he fails to make clear. General Smith was selected by General Sherman to capture or kill General Forrest and was advised by General Sherman as to what he would be up against. His was the third expedition sent out from Memphis with the same object, each one of which had a much larger force than General Forrest and much better equipped.

The two first were badly defeated. General Smith claimed to have defeated Forrest, but General Sherman discredited his report and ordered General Washburn to send him back to "hang on to Forrest" and keep him out of Tennessee. General Smith, as a good general, should not have left La Grange without sufficient food for a long march. His having to retreat on account of short rations was not creditable. It was stated that he had but one day's rations and with this it took him four days to get back to LaGrange. If he had defeated Forrest he had only to make one day's march beyond Tupelo to be in a land of plenty, where he could have subsisted his army for months. The prairie lands of northeast Mississippi were the grainary of that whole section of the Confederacy. At that date the wheat and barley had been harvested and the corn was in the shuck in the fields. I was with General Forrest from early in September, 1864, until November. I was about 100 miles south of Tupelo at the time of the Smith expedition.

I have no idea how many Confederate operators were captured; I don't remember to have heard of but two—James Compton was captured at Canton, Miss., and taken north. After a considerable while he was released or exchanged. At the close of the war he was made district superintendent of the Western Union Telegraph Company at Nashville. Frank Jones, of New Orleans, was captured by Sherman in Mississippi. He went north and secured employment. J. W. Kates went north and became general superintendent.

It is a historic fact not generally known that General Forrest placed *hors de combat* thirty men with his sword and pair of navy sixes that he always carried in his belt—most of them killed—and had twenty-nine horses killed under him in battle.

But as Brother Robinson and I are both getting into the "sere and yellow leaf," it will not be necessary for us to fight the Civil War. As General Grant said, "Let us have peace."

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EDITORIAL COMMENT

Arlington Signals Set Clock Automatically

ARLINGTON time signals transmitted by radio at noon and 10 o'clock p. m. may soon be adopted to set your clocks automatically. It is somewhat of a bore to listen for five minutes preceding the receipt of the long dash from NAA which indicates standard eastern time twice daily, and then set your clock or watch as accurately as possible. It is necessary to have the exact time at sea, where it is used in navigation, and all the preliminary dots from NAA are followed and counted carefully by radio operators and navigators so the ship's chronometer may be checked accurately. But many shore radio fans would prefer a stand-by signal followed by a quick announcement "Ten o'clock."

A recent experiment in radio clock setting performed at the Bureau of Standards will be beneficial and pleasing to all listeners-in, radio operators, amateurs and experimenters. With special apparatus your clock, properly connected, may be set for you twice daily by radio. Arlington has been transmitting time signals received by wire from the Naval Observatory standard clocks since 1912, and has been regulating Western Union Telegraph and Postal Telegraph-Cable Company's master clocks by wire since 1916. There is nothing new in transmitting time signals or in setting clocks, as thousands of clocks throughout the country are so set daily.

But Dr. J. H. Dellinger of the Bureau of Standards, has just reported the setting of a Lighthouse Service electric program clock installed in the laboratory at the bureau of radio signals from Arlington. This is different and new. What is more, properly installed clocks may soon be set by radio for railroad stations, ships at sea and in outlaying sections where no other communications exist. This method may be applied to ringing alarms at noon and ten p. m. if desired, and could be employed at other hours of the day if Arlington sent more frequent signals.

The essential elements, Dr. Dellinger says, are:—A good radio receiving set, with an efficient antenna; a radio relay; a retardation relay and a suitable clock. The bureau was experimenting with a clock of the Lighthouse Service used for carrying out daily programs and capable of setting or control by an electrical relay. The bureau also had a radio relay which would operate the clocks relay when a certain signal was received by radio. These pieces of apparatus were hooked up and a special series of radio relays interposed and so adjusted as not to operate during the receipt of the preliminary dot signals from NAA. They functioned when the dash came, however, and operated the main relay, setting the clock at the hour—that is, noon or ten p. m. The radio relay was connected up to the receiving set in place of the usual phones. Dr. Dellinger also pointed out that further adjustments could be effected so as to turn on the tubes of the receiving set by radio impulses, and such as the series of dots five minutes prior to the receipt of the hour dash, thus automatically operating the set when the owner was absent, provided it was properly tuned, and insuring the time correction of the clock.

A device attached to the clock at the bureau stops the hands at exactly twelve noon and ten at night, in the event it is fast. When this is the case the operation of the train of relays simply releases the hands at the proper hour, when the dash is received. The complete circuit is not perfected nor is the apparatus on the market yet for the ordinary radio fans, but it is understood that it is easily hooked up.

The First Radio Wedding

THE first RADIO wedding took place in New York recently, when the loudest "I will" that the world has ever heard, went bounding over the ether when Wendall Hall, a popular singer was married to Miss Marion Martin, a Chicago newspaper writer.

The whole wedding ceremony was broadcasted and was probably listened to by a million radio "fans." Not only did the ether carry the manly pledge of the bridegroom, but that lucky gentleman uttered the words already mentioned in a resounding base voice, which shook the transmitting microphone. This was followed by the broadcasting of the bridegroom's kiss to the bride which was a real smack that told the world what an enthusiastic kiss it was.

The RADIO wedding was bound to come as weddings have taken place in balloons, in airplanes, zeppelins, down a mine, on the brink of Niagara Falls, in a lion's den, in a racing motor-car and quite recently one took place with the principals and the ministers dangling by their waists at the end of long ropes suspended from a skyscraper. So why not a wedding where all the world could hear even if it could not see!

"Radiocasting," Not "Broadcasting" the Proper Word Now

The word "broadcasting" was officially stricken from the radio world by the experts in the recent convention of Associated Manufacturers of Electrical Supplies and "radiocasting" substituted.

The change was made on the recommendation of the committee on radiocasting after it was found that the dictionary revealed that broadcasting "has to do with sowing of seed or material substance," and would not be applicable to the spreading of sound through the air.

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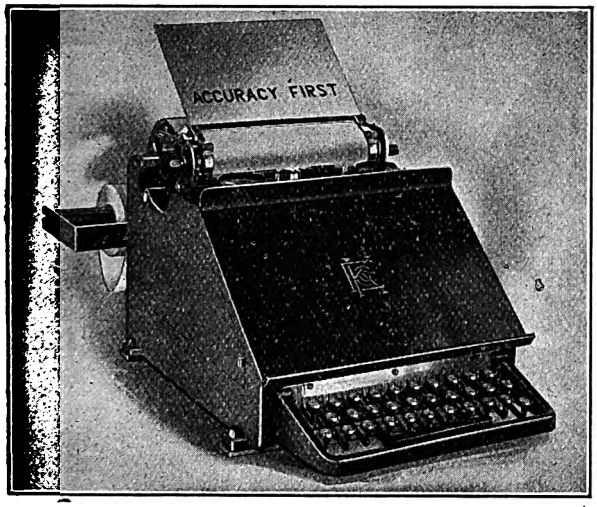
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER

AN ENTIRE SYSTEM IN



ONE SIMPLE TYPEWRITER UNIT

Not Merely A New Design.

A Revolutionary Change.

The Unit that proves in on lightly loaded circuits.

Kleinschmidt Electric Co.

LONG ISLAND CITY, NEW YORK

HALL SWITCH & SIGNAL CO.

Garwood, N. J. Chicago

MANUFACTURERS OF THE

GILL SELECTOR

THE UNIVERSAL SELECTOR

FOR

TELEGRAPH AND TELEPHONE

EDISON PRIMARY BATTERIES--

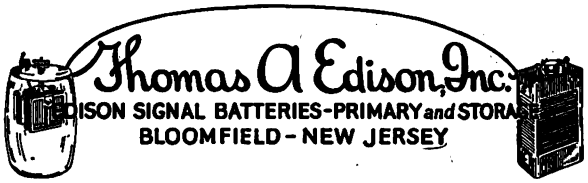
last longer and cost less

Efficiency in railway telephone and telegraph service depends essentially upon the source of electrical energy,—the battery.

"Open circuit" batteries weaken as the ampere drain continues in the transmission of long conversations or messages. The result is a rapid diminution in the intensity and clarity of the messages transmitted.

Edison Primary Batteries maintain their full rated voltage throughout a long life of service, regardless of how steady the drain, or the demands upon the battery. Yet they do not deteriorate if left standing unused for months at a time.

Edison Cells last about twelve times as long as dry cells, and cost less per unit of service rendered, resulting in a marked increase in efficiency and economy in all telephone and telegraph service.



ST. LOUIS Railway Exchange Bldg. CHICAGO Peoples Gas Bldg. SAN FRANCISCO Balboa Bldg.

2024-36

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THE RAILROAD

elegraph and Telephone Section of the American Railway Association

THE second set of inserts for the Manual of ecommended Practices, containing the following pecifications, recommendations, etc., will be issued the near future:

escription of Causes and Effects of Induc-

RECOMMENDATIONS	NUMBER
tive Interference	7-2
oint Occupancy of Buildings for Telegraph, Telephone, Signal or Other Electrical Apparatus	2-H-2
ocal Telephone Directory	6-9
Method of Keeping Record of Requests for and Completion of Long Distance Telephone Calls Over Railroad Telephone Circuits	6-11
ecessity for Transmitting Initials of Railroads after Signatures	6-8
umbering Messages	6-12
outine for Handling Telegrams by Telephone	6-10
heory of Inductive Interference	7-1
heory of Simultaneous Telegraphy and Telephony	2-J-4
ools and Equipment for Aerial and Underground Cable Work	1-A-4
ools and Equipment for Section Linemen	1-A-3
ools and Equipment Necessary for a General Construction or Repair Gang	1-A-2
Tools and Material for Emergency Cable Work	1-A-5
Typical Telegraph and Telephone Department Organization	M-1
Use of Tie Lines Between Railroad Telephone Private Switchboards	6-7
SPECIFICATION	
Basic Rules and Pole Tables for Construction and Maintenance of Wood Pole Lines Along Railroads for Telegraph and Telephone Service	1-A-1
Block Mounting ARA-1-A	2-G-7
Braided Office Cable of Non-Quadded Twisted Pairs of Rubber Insulated No. 16 A.W.G. Conductors	2-G-2
Cable Arresters	4-5
Circuit Cross Connection Records for Wire Chief and Terminal Offices	2-K-5
Cross Connecting Ring ARA-1-A	2-G-3
Cross Connecting Ring ARA-2-A	2-G-4
Designation Card Holder ARA-34-A	2-G-13
Fuse Block ARA-1-A	2-G-5
Fuse Block ARA-2-A	2-G-6
Heat Coils	4-7
Installation and Maintenance of Caustic Soda Batteries	2-K-2
Installation and Maintenance of Dry Batteries	2-K-1
Installation and Maintenance of Gravity Batteries	2-K-1
Installation and Maintenance of Stationary Lead Type Storage Batteries	2-K-4

THEY WANT THE BEST

Another of the large New York Press installations have been converted to Morkrum Typebar apparatus.

The International News Service has used Morkrum apparatus for seven years and when their traffic increase demanded new apparatus, four Transmitting sets and thirty-two Receiving sets of Morkrum typebar equipment were ordered.

MORKRUM COMPANY

CHICAGO
1410 Wrightwood Avenue

NEW YORK
726 World Building

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Instructions and Sample Forms to be Used by Wire Chiefs in Compiling and Recording the Information Called for by the Requirements of Routine Governing Wire Chiefs 2-J-3
Instrument Fuses 4-6
Jack ARA-200-A 2-G-10
Lead Sheath Office Cable of Non-Quadded Twisted Pairs of Cotton or Silk and Cotton Covered Enameled No. 18 A.W.G. Conductors 2-G-1
Line Fuses 4-3
Locations and Layouts for Telegraph and Telephone Apparatus in Way Stations 2-H-1
Office Arresters 4-4
Porcelain Filler Button ARA-3-A 2-G-14
Porcelain Jack Panel ARA-4-B 2-G-9
Protector Mountings 4-8
Protectors 4-9
Routine Governing Wire Chiefs 2-J-2
Single Conductor Cord ARA-5-A 2-G-11
Single Conductor Plug ARA-1-A 2-G-12
Soldering for Inside Plant 2-K-6
Telegraph, Telephone and Other Communication Wires and Cables Crossing the Tracks of Steam and Electrified Railroads 1-B-1
Terminal Block ARA-2-C 2-G-8
Wire Chief Equipment in Railroad Offices .. 2-J-1

The foregoing have been adopted by the Telegraph and Telephone Section and approved by the General Committee of Division 1—Operating and the Board of Directors of the American Railway Association.

This set of inserts will include also Specifications for the Installation of Telegraph and Telephone Equipment in Railroad Offices 2-1, Protection Against Electrolysis 3-1, Traingrams 6-4, Semi-Automatic Sending Keys 6-5, and Dictating, Transcribing and Filing of Telegrams 6-6, which have now been officially approved, printed on white paper to be substituted for the same specifications and recommendations which are now printed on blue paper in the Manual.

The Committee of Direction has ruled that no specifications, recommendations, etc., in the future will be placed in the Manual or Pocket Hand Book until they have received official approval. This will eliminate the practice of printing specifications and recommendations on blue paper.

When the first set of inserts (1921) for the Manual was issued sets were distributed gratis. On account of the expense involved the Committee of Direction has decided to discontinue this practice.

In order to ascertain the number of sets of inserts that it will be necessary to have printed, will you please advise me promptly on the attached form how many sets of inserts for the Manual you desire to order. At this time it is not possible to advise the cost of a set of inserts. However, the cost will not be as much as the 1921 set of inserts.

The cost of the Manual binders to the representatives of members and affiliated members is as follows:

$1.50 per binder in lots of 50 or less.
$1.25 per binder in lots exceeding 50.

Please indicate the number of binders you want forwarded to you.

As soon as the inserts for the Manual are printed and distributed arrangements then will be made to issue the second set of inserts for the Pocket Hand Book which will contain the same specifications, recommendations, etc., as are to be placed in the Manual.

The Committee of Direction has decided that specifications, recommendations, etc., to be placed in the Pocket Hand Book (after the first set of inserts) may be sold in complete sets or separately as the senior representatives and others interested may desire.

Will you please also indicate the number of sets of the inserts for the Pocket Hand Book you will need?

If you desire to purchase the specifications, etc., for the Pocket Hand Book separately, please indicate the number of copies of each you will require.

The cost of the Pocket Hand Book Binder to representatives of members and affiliated members is as follows:

$ .75 per binder in lots of 50 or less.
$ .60 per binder in lots exceeding 50.

Please indicate the number of binders you desire to purchase.

W. A. FAIRBANKS, *Secretary.*

COMMITTEE No. 11, Telegraph and Telephone Transmission, met in the secretary's office, 30 Vesey Street, New York, on July 9th. This was a joint meeting consisting of members of the Telegraph and Telephone Section and the representatives of the Committee on Nomenclature of the American Telephone and Telegraph Company. The object of the meeting was to unify the designations for the telephone and telegraph service, particularly telephone circuit designations.

Among those present were: D. Sargent, representing the American Telephone and Telegraph Company, B. F. Thompson, D. V. Adams,, C. D. Briggs, W. H. Capen, J. H. Ditch, H. W. Drake and C. F. Stearns, representing the Telegraph and Telephone Section.

A meeting of Committee No. 4 Electrical Protection, will take place in New York on July 16th. Matters of a routine nature will be considered.

Japanese Railway Electrification Progressing

THE Government of Japan has purchased over $2,000,000 worth of American electric locomotives and substation-power equipment in connection with railway-electrification projects during the last two months. Government-machinery requirements have also resulted in a fair amount of business.

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PERSONAL

T. W. GOULDING, retired, London, England, who as been in Havana, Cuba, for the winter, was in lew York last week enroute to London via Monreal.

POSTAL TELEGRAPH-CABLE CO.

VICE PRESIDENT and General Manager Edward eynolds and Mrs. Reynolds recently spent several ays at Shawnee-on-the-Delaware, enjoying golf and ther sports with a part of mutual friends.

C. A. Comstock vice-president, attended the conention of the Society of Automotive Engineers, eld at Spring Lake, N. J., June 25th-27th, inclusive, s the representative of the Company.

Charles Maurer chief clerk to Vice President C. . Comstock, is on vacation.

J. P. O'Donohue, assistant chief engineer, is havg a rest at Lake Owassa, N. J.

D. H. Gage, assistant engineer, has just returned rom a vacation spent at New Baltimore, N. Y.

The new line being constructed from Fort Worth, exas to Los Angeles, Calif., is nearing completion.

R. Gould, general supervisor of plant, intends isiting his birthplace, Musquodoboit, Nova Scotia, hile on his vacation.

Sincere sympathy is extended to P. L. Lee, anager, Milwaukee, Wis., whose father died on uly 5th.

Superintendent J. J. McDermott, second district, letropolitan Division, was in personal charge of ie commercial department at Madision Square arden during the progress of the Democratic Naonal Convention, looking after the large force of epresentatives who were taking care of the newsaper correspondents and the delegates.

T. N. Powers, assistant traffic manager, was in harge of the operating department, assisted by uad and loop chiefs of the New York main office, aking care of the many circuits that were extended the Garden for handling the business.

A temporary office was also opened at the Manattan Club, 26th Street and Madison Avenue, here a force of experienced branch office people ook care of the business of the club members and isiting delegates.

The "Postal Telegraph" magazine for the month f July contains a very interesting article on pokane, Wash., together with a number of picures showing the business development of the city s well as many of the attractive points of interst in the nearby territory.

IN the death of Robert Stewart, the staff has lost ne of its most valuable and beloved employees. Mr. Stewart became an employee twenty years go as an operator. In a few years he was assigned the Northern Traffic Division, from there he went the Quadruplex Department. His genial manner f doing business won him many friends in the arious cities, and many sent regrets on hearing of is demise. He will be missed greatly by all who ad the pleasure of knowing him.

Commercial Cable Company

J. B. HAMMING, superintendent, Commercial Cable Company of Cuba, Havana, Cuba, has returned after a tour around the world.

OBITUARY

JOHN WINTRUP, aged eighty years, died in Philadelphia on June 29th. Mr. Wintrup was one of the best known members of the Old Time Telegraphers' and Historical Association in the Quaker City, having spent his entire life there. At the breaking out of the Civil War in 1860 he joined the United States Military Telegraph Corps and was a prominent member of that body. He served at Washington, D. C., Wilmington, New Castle and Lewes, Del. This wire was the only outlet that the War Department had with its armies around Fortress Monroe, the James, Potomac, etc., and was one of the most important to be kept up.

It was no uncommon occurrence for operators and a lineman to take a locomotive, a long pole with a lighted torch on its end, put this out of the cab window and start at midnight to clear wire troubles, then return to their office at 40-mile-an-hour-gait.

After the war he entered the service of the American Telegraph Company at Philadelphia, and was soon put in charge of three of that company's most important branch offices. In 1876 he entered the employ of Messrs. Peter Wright and Sons, the well known steamship agents, as their telegraph manager.

Mr. Wintrup could entertain one for hours with his funny experiences as the "boy soldier operator." How he and others at midnight drove 5 miles, held up the Washington Express, at Wilmington, Del., looking for the assassin Booth, etc. "Jack" as he was familiarly called by the old timers, was well and favorably known to all the profession from the superintendent down to the messenger boys.

On one occasion Mr. Wintrup in signing his name to one of the government documents made an extra scrawl out of the "y." When President Lincoln saw the scrawl he remarked that this communication came from the man that wrote his name with a funny scrawl.

Mr. Wintrup is survived by his wife. His remains were buried in Wilmington on July 2nd.

HARRY YOUNG, aged fifty-five years, well known in New York telegraph circles, died in Philadelphia on June 28th. Mr. Young was formerly a clerk in J. H. Bunnell and Company of this city, but for the past ten years has been in Philadelphia representing another house.

Previous to his going to Philadelphia, Mr. Young had been identified with the Western Union Telegraph Company and he was well known to the older members of the telegraph profession. Interment was in Mount Kisco Cemetery, N. Y., on July 2nd. His parents reside in Harlem, N. Y.

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THE WESTERN UNION TELEGRAPH CO.

W. C. TITLEY, general superintendent of plant, is absent from his office on vacation. He will return on August 1st.

MESSERS. B. H. Heathcock of Denver, A. V. Helminger, S. P. Boughton of Atlanta, E. H. Martin and O. E. Pierson of Chicago, F. W. Payne of Kansas City, H. E. Bradford of Dallas and G. F. Hohenshild of San Francisco, all division traffic representatives are in New York on a special assignment in connection with the adoption of tape printers on multiplex circuits.

Money Transfer Frauds

ON April 5th, a message was filed at Mineral Wells, Texas, addressed to the First National Bank, Breckenridge, Texas, signed J. G. Higginbotham, requesting that $100.00 be wired with personal identification waived.

Upon receipt of this message at Breckenridge and as someone had in 1922 perpetrated three similar money transfer frauds using J. G. Higginbotham's name, the bank did not wire the money—notwithstanding J. G. Higginbotham had an account with it—but immediately put us on notice of the apparent fraudulent transaction and when we had the matter taken up with the correct payee he proceeded immediately to Mineral Wells and succeeded in having the imposter, whose correct name is Richard Colston or A. B. Coulson, apprehended and convicted on a charge of fraud and sentenced to two years in the penitentiary.

In the meantime, we definitely identified the imposter as the man who received the money on a money transfer deposited at Beckenridge on August 28, 1922, payable to J. G. Higginbotham, Ft. Worth, Texas. The bank that cashed the draft at Ft. Worth charged the imposter with fraud in the case of 1922 and he was turned over to the Ft. Worth authorities for prosecution, but recently escaped jail at Ft. Worth with several other prisoners and has not as yet been heard from.

The imposter is described as follows:

Age, 25 years; weight, 135 pounds; height, five feet, seven inches; hair, dark brown, wavy; eyes, hazel; round depression in left temple, bone has been removed and no plate substituted.

While we were unable to identify Colston as the man who received the money on the other two transfers which were paid to an imposter in 1922 who went under the name of J. G. Higginbotham, it is clearly evident that he is the man.

Please notify your people to be on the lookout for a man of this description and if he appears notify the police that he is wanted at Ft. Worth in an effort to have them detain him and wire me.

F. A. MOHR.
General Manager, Gulf Division.
Dallas, Texas, June 25, 1924.

Western Union Telegraph Company is Improving its Plant in Monroe, La.

Two, and at times three, gangs have been employed for the last few weeks in construction work for this company. New wires are being replaced and new poles substituted for old ones. The chief improvement, however, will consist of the stringing of new copper wire. The entire route from Monroe to Alexandria along the Iron Mountain is to have copper wires installed, giving through circuits for duplexes and automatics.

Special emergency wires between Shreveport and Monroe are provided as is provision for extra files that may at any time be required for the Monroe office.

The office is virtually newly equipped, switchboards and other equipment being up to date and the company now states that it can care for any emergency or file with the completion of the present installation. The regular local is a duplex to New Orleans and 6 to 8 wires are added to Shreveport. If necessary the local office can operate a duplex with four singles as an outlet.

Cable leads into the office on So. Grand are to be rebuilt soon and the office itself is to be all re-decorated and made more attractive.

The present manager, E. R. Dawson, has been with the company as Monroe manager since a little over a year ago. Before that time he was relief man for the entire state of Texas out of Dallas.

Instructed in Handling Summer Telegraph Traffic

THE members of the regular summer forces of this Company, met at the Chamber of Commerce, on July 1st, at Boston, and received instructions in the handling of traffic, particularly to summer points, and in business development.

The meeting was in charge of A. M. Pearson, District Commercial Agent of Boston. Previously, the employees have assumed their duties with only usual instructions. This year it was thought well to call them together and discuss in an informal way some of the problems and give them explicit instructions in the subject matter involved.

The summer business is now practically in full swing and District Manager Pearson and T. H. Harrigan, manager of the Gloucester territory, are getting the summer branches at East Gloucester, Bass Rocks, Rockport and Magnolia under way. The Manchester office in charge of William J. O'Brien, was opened some time ago.

Harry Young is in Wheeling on Visit

HARRY YOUNG, retired telegraph operator and manager of the Wheeling office of the Western Union Telegraph company, is visiting for a few days. Several months ago Mr. Young went to Chicago to make his home with his sister, with whom he lived on North Main street.

A few years ago Mr. Young was retired from the Western Union after having faithfully served a half century as a telegrapher and manager. Despite

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is age, the veteran of the key is active today as a han half his years.

"Chicago is a great city," said Mr. Young, "but have no love for such a big place. The coldness f a large city is distressing. Here I know thouands of people, a number of whom were my boy hums, while there are many I know from babyood. When I went to Chicago I left all these dear riends behind. I couldn't stay away any longer—I ust had to come back, even for a short time, to ningle with my old friends. It has been a most enoyable visit, to say the least," continued Mr. Young.

Mr. Young was located for fifty-five years on Twelfth street. He became an employee of the ocal office of the company when Andrew Johnson vas president of the United States, who succeeded Abraham Lincoln. Year in and year out he faithfully worked and climbed the ladder of promotion ntil at his retirement he occupied the highest posiion in the office. He is the oldest former manager f the company in the state and among the oldest n the country. Lon H. Hutchinson, who for many ears was manager of the Western Union office at Huntington and resigned about twenty years ago, erhaps ranks next to Mr. Young as the oldest livng official to occupy a similar position in West Virginia.

"I shall leave in a few days for Chicago," concluded Mr. Young, "but I shall return to Wheeling or a visit as often as possible. I shall take back o the west the happiest memories of the delightful reeting given me by my old friends."

HANLON D. WRY, local manager of the Company, t Brockton, Mass. was found dead on June 24th, in his garage at Spring street, overcome by carbon monoxide gas fumes from his automobile, on which he was working. He was about forty-five ears of age and came to this city a few years ago o take up the managership of the office. He was vell known and had been a member of the Commercial Club, a prominent bowler, and also a member of the Kiwanis Club. He is survived by his wife and two children.

Mr. Wry went into his garage about 9 A. M. At he time he went in the doors were open, but for ome unknown reason he either closed the doors or the wind blew them together. About an hour ater Richard Berry, who lives near, saw what ooked like smoke coming from one of the windows of the garage. He ran over and opened the doors and found Mr. Wry lying on the floor, with his head against a rear wheel.

E. A. GOGGIN, for three years manager of the Lewiston, Maine, office of the company, has been transfered to Portland, where he is now in the traffic department. His successor in Lewiston is H. L. Doyle, who has been manager of the office in Calais about nine months.

Elmer D. Osborne Retired on Pension

ELMER D. OSBORNE, widely known in Albany, especially to patrons of the company, has just completed fifty-two years' service with the company and has retired. He will receive a pension as chief bookkeeper.

Mr. Osborne intends to remain in Albany and rest after his retirement. "I guess I'll miss the click of the telegraph key, somewhat," he said, "but I think I can find enough to keep me busy. No, I'm not going on a farm, just going to stay in Albany. I like Albany and any other place would not have the same attractions that this has."

When Mr. Osborne began with the company the office was located on the main floor of the Museum Building at State Street and Broadway, now the site of the Albany Trust Company. He began as a checker and he rose step by step until now he is the chief bookkeeper.

"I have seen a good many changes in Albany since I first went to work on that old corner," he said. "One night the building caught fire and we had to move our office across the street to the old Exchange building, which was on the site of the present postoffice.

"Speaking of fires reminds me of the fire in the old Delavan house on that memorable Sunday night, December 30, 1894. I'll never forget it as long as I live. Bill Van Zandt was to have worked that night trick and he was due at the office at 8 o'clock. But you know how it is with the young fellows, he had a girl and of course work was not to be thought of. I told him I'd work until 10 o'clock. The fire was about 7 o'clock and I was swamped with messages.

"William J. Morgan was the manager then. He had left orders that whenever there was a big fire to notify him. I sent a boy up to his house to have him come down. He did so and he rounded up all the available operators. Guests of the hotel and hundreds of legislators who had come for the opening of the session were sending messages to their homes telling of the fire and that they were safe.

"Bill Van Zandt and I worked until 2 o'clock in the morning taking in messages. We soon got operators and then the press men came in on us. It seemed to me that every newspaperman in Albany filed a special that night. Joe McEntee was on the Sun then and the others all filed big stories, for there were people of prominence in the hotel.

"John Keep was the first manager of the company that I knew. Then came Harvey Dwight, A. R. Rugg, William J. Morgan, Thomas J. Meade, W. H. Doherty and then William H. Van Zandt.

"We all knew the newspapermen who came to Albany for the legislature sessions. There was George F. Spinney, Hugh Hastings, Pat Relihan, George Janvrin, Joe McEntee, Depuror, of the Staats-Zeitung and William H. Brainerd and many others whose names escape me for the moment. Of course Edgar C. Murlin, now in the Court of Ap-

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peals, had been coming to Albany for his paper. William Loeb, who later was secretary to Governor Roosevelt, was in charge of the messenger boys delivering telegrams during the time I was with the company.

"In those days there were not so many telegrams delivered by telephone. When one wanted to send a telegram he pulled a call box and a boy came for the message. The messages all were written out in longhand for many years, for typewriters were unknown then, or at least were not in general use as they are now. No telegrams were delivered over the wire, but a boy would take a bundle of them and deliver them.

"In the early days the press men would come down to the office after the session and taking a big stack of paper would begin to write their stories out in longhand. The majority of them wrote fast and made perfectly good copy.

"During the Conkling-Platt fight in the Capitol I can recall how busy the newspapermen were. They worked day and night sending out reams of copy. In one night I remember sending 45,000 words to the New York World alone.

"When the typewriter was first installed in the company many operators shook their heads and said it would never do, it was too slow. Now look at it. Now messages are taken on the printer and no hand excepting the one sending the messages touches it until it is finished."

New Invention to Improve Broadcasted Concerts

A DESPATCH from Munich, states that a new invention has been perfected that brings out the fullness of beauty and tone of all musical instruments as well as that of voices when broadcasted by rendering the performance through the ordinary wire telephone.

An exhibition of the new apparatus was given recently to the press and wireless experts, when the second act of the opera "Walkyrie" was broadcasted. It was unanimously agreed that the performance was heard perfectly under the new conditions.

The transmission is obtained by the installation of receiving microphones in the orchestra and on the stage, the sound waves passing through an amplifier in the shape of electron valves and being carried to the central telephone exchange from where they are distributed over the ordinary wire telephone to all subscribers. The great advantage of this system, it is declared is the fact that ordinary business or social calls are not in any way interefered with, as on receipt of one, the concert is automatically stopped to the particular subscriber and resumed immediately.

E. ALEX SCOTT, a member of the Society of the United States Military Telegraph Corps, died recently in Philadelphia. In 1890 Mr. Scott was superintendent of the Electro Dynamic Company, afterwards merged in Electric Storage Battery Company of Philadelphia. He is survived by his wife.

Old Time Telegraphers' and Historical Association

THE Old Time Telegraphers' and Historical Association has issued its invitation to the membership at large for the annual reunion to take place at the Hotel Roosevelt, New Orleans, La., on October 30th, 31st and November 1st.

The Committee on Arrangements assures us that every minute of the three days will unfold new wonders in interest and enjoyment.

Hence, we cordially invite you to come to New Orleans, and be happy with us.

The climate is ideal—not too hot, not too cold—just right for young and old. You will enjoy every minute of your visit in the Paris of the South.

The history of New Orleans teems with rare romance, and in no other city in America can be found the same touch of European Mediaevalism which makes it distinctive as a shrine for visitors.

There are many excellent hotels and restaurants here, world-famed for their cuisine, and their rates are graded to meet any purse. You will be charmed with your accommodations.

The city is modern and up-to-date, with a perfect system for supplying pure water. Its parks are beautiful. Fine golf courses, tennis, motoring, boating and sightseeing afford agreeable entertainment.

Programme

OCTOBER 30:

10:00 A. M.—Preliminary gathering, Hotel Roosevelt

11:00 A. M.—Business session of the Association, and United States Military Telegraph Corps.

12:30 P. M.—Luncheon, Hotel Roosevelt.

3:30 P. M.—Automobile ride over the city.

October 31:

1:00 P. M.—Steamer trip on the Mississippi River. Industrial Canal, and Lake Pontchartrain. Picnic lunch; dancing.

November 1:

10:00 A. M.—Tour of Old French Quarter, under direction of professional guides.

4:00 P. M.—Tea for the Ladies, St. Charles.

7:00 P. M.—Banquet and dance (informal,) Hotel Roosevelt.

For information, apply to Secretary, Hotel Roosevelt, New Orleans, La.

It is to be hoped that a large number of the members will so arrange their affairs, that they will be able to take in this reunion in this historical city where so many of the brilliant telegraphers of the past spent happy days.

The president of the Association is F. A. Mohr, Dallas, Texas, and Thomas E. Fleming, 195 Broadway, New York is secretary.

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ɔanish Telephone System to be "Americanized."

REPRESENTATIVES of the American telephone inıstry have succeeded in arriving at an agreement ith several important Spanish banks for the purse of taking over the present telephone systems Spain and installing a modern up-to-date service, cording to the Department of Commerce from adrid.

It is stated that the agreement provides for the rmation of a corporation to take over the entire lephone service and the installation of an autoatic service similar to that in Havana and the rger Spanish cities. The capital is to be raised by ı issue of obligations financed by Spanish capital, e technical staff and material to be American. It ıs more recently been reported that a controlling terest in the Madrid telephone company has been quired by the new corporation through the purıase of stock on the bourse, and that negotiations re already under way for obtaining the concession ɔr the Barcelona telephone service.

For many years the telephone service in Spain, ɔth local and long distance, has been the subject of iticism, and it has undoubtedly been a serious imediment to conducting business in a modern manɛr. Even in Barcelona, the most progressive city in ıe country, scores of important commercial and rofessional firms have refused it is said to install elephones on account of the poor service afforded, nd those who do have phones use them more for ıking and leaving messages through office boys than ɔr carrying on conversations. Apartment houses eldom have more than one instrument for the enre building, and a telephone in a private home is ıe exception rather than the rule. The present quipment, for the most part of Swedish manuacture, is antiquated, and it has been almost ınpossible to have any new instrument installed, ecause existing charters provide that upon reversion f the lines to the State within the next few years, ll material is to become the property of the Governıent.

Radio Broadcasting to Start in Peru

FINAL arrangements have not as yet been made, ut radio broadcasting will soon be started in Peru ɔy the Peruvian Broadcasting Company of which he Marconi Company is a stockholder. Arrangeıents are now being made with owners of a new ıotel under construction in Lima, to secure roof pace for the installation of the station. The Peruian Broadcasting Company holds an exclusive conession from the Government for broadcasting.

Electrical Developments in Egypt

A RECENTLY established electrical company in Cario apitalized at 10,000 Egyptian pounds, is said to be ontemplating the purchase of the franchise of the ompany (Lebon & Co.) supplying electric service to Cairo, Alexandria, Port Said, and Ismailia. The ıew company will issue shares to cover the value of he concession and offer them for sale to the people ɔf the cities mentioned.

Japanese Protest Radio Franchise of United States Company

FURTHER representations against the signing by Chinese government of the bonds of the Federal Telegraph Company have been made to the foreign office by the Japanese legation at Peking, according to a statement by the foreign office.

The Japanese protest, said the statement, was based on grounds similar to those set forth in earlier representations, which argued that the contract with the Federal Telegraph company constitutes an infringement of the Amitsui company of Japan, which, the protest said, carried a monopoly for wireless construction in China for thirty years.

Announcement was made last August by Richard P. Schwerin, past president of the Federal Telegraph Company, that his company, in conjunction with the Radio Corporation of America, had signed an agreement with the Chinese government permitting immediate construction of five powerful wireless stations in China, which would establish direct communication between the United States and China.

The Marconi Beam System

TESTS made by Senatore Marconi from Poldhu to Beunos Aires in the Argentine Republic have been successful. The first message was transmitted last week-end in Spanish, and was the first message which has been transmitted to the Argentine by the beam system; according to telegraphic advice it was received upon a single transmission. The message was dispatched direct in Morse on a 92-metre wave length, the distance covered being just over 6,000 miles. Communication is at present by cable *via* New York or the Azores, Cape Verde Islands, and Ascension, taking about six hours.—*Electrical Review.*

Automatic Telephone Control for Switzerland

THE commission of the National Council has decided to recommend, without modification, the acceptance of the proposal of the Federal council relative to alterations at the Berne post office to accommodate the installation of an automatic telephone central. A credit of 337,000 francs will be necessary for this purpose.

W. J. DODGE, superintendent of the Western Union Telegraph Company, Pittsburgh, Pa., when we wrote him sometime ago that we had renewed his subscription replied: "Sure thing. I'll tell you when I can get along without it."

Coming Conventions

OLD Time Telegraphers' and Historical Association, Hotel Roosevelt, New Orleans, La., October 30th, 31st and November 1st.

Telephone Pioneers of America, Chicago, October 10th and 11th.

Telegraph and Telephone Section of the American Railway Association, Hotel Frontenac, Quebec, Que., September 9th, 10th and 11th.

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Copies of "Submarine Telegraphy," parts one and two, printed by the American School of Correspondence, can be obtained at the office of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York, at $2.00 for the two books. These two books together comprise 166 pages, and by competent authorities it is said to be the best explanation of submarine telegraphy ever printed. The matter was prepared by experts in the Western Union Telegraph Company's cable service. The subjects treated after the introduction comprise, physical factors involved, general properties; resistance; capacity, leakage; absorption; inductance; transmission of signals, telegraph codes; comparison of codes; arrival curves, general problems; artificial line of two sections; four-section artificial line; real cable with capacity uniformly distributed; earthing cable after applying battery; formation of dots or dashes or real cable; building up arrival curves; methods of overcoming distortion, use of earthing interval in dots and dashes; curbed signals; signaling condensers; magnetic shunts; shunted condensers; speed of signaling, KR law; generalized KR law; speed constant of cables; duplex cable telegraphy; general arrangement; differential duplex; bridge duplex; Muirhead double-block bridge duplex; artificial cables, Stearns, Muirhead, and Dearlove types of artificial cable; installation and adjustment of artificial cables, difficulties with artificial cables; balancing process; examples of unbalanced conditions; balancing troubles; duplex transmission; signaling apparatus, cable keys; automatic machine transmitters; perforators; receiving instruments, Thomson galvanometer; Kelvin siphon recorder; modern Muirhead recorder; Direct-writing siphon recorders; Brown drum relay; Muirhead features; economic design of cable core; cable testing, tests during manufacture; tests during laying; gold-wire relay; Heurtley magnifier; selenium magnifier; design and construction of cables, general final tests; tests on good cable; false-zero method of making resistance measurements; current-reversal method of measuring resistance; Mance's method of conductor resistance tests; capacity tests on good cables; De Sauty method for comparing capacities; direct deflection method for comparing capacities; Gott method of comparing capacities; localization of breaks and faults; break tests; Kennelly two-current break test to false zero; partial earth faults, loop tests; overlap tests. The subjects are fully illustrated.

The Most Sought After Electrical Book on the Market

"Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," by Willis H. Jones, offers the most complete study of the telegraph ever published. This standard text-book has been revised and brought up to date, and in addition to numerous diagrams and complete information covering the study of the telegraph, includes full descriptions of the newest apparatus adopted by the Western Union and Postal Telegraph companies, and describes the equipment of a modern telegraph office. This valuable book, with its 488 pages, 250 illustrations, and carrying an appendix of 24 pages and 16 illustrations covering the new Western Union Multiplex System, is the most sought after electrical book on the market. $2.50 per copy. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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LET nine authorities advise you what apparatus is the best before putting your money into a radio set. Learn the principles of operating first and then you can purchase your apparatus intelligently.

There is one book that can give you all the information that you will need and in an entertaining and charming style.

Radio Phone Receiving the collaborative effort of nine of the biggest men in the radio field, including Michael I. Pupin, Louis H. Hazeltine, John H. Morecroft, John V. L. Hogan and Erich Hausmann, is undoubtedly the best book for the beginner, because it is both absolutely accurate and interesting reading as well. Price $1.50. For sale by Telegraph and Telephone Age, 253 Broadway, New York.

He Looked Guilty

A COUNTRY school board was visiting a school, and the teacher was putting her pupils through their paces in history.

"Who signed Magna Charta, Robert?" she asked, turning to one boy.

"Please, ma'am, 'twasn't me," whimpered the youngster.

The teacher, in disgust, told him to take his seat, but an old tobacco-chewing countryman on the board was not satisfied. He grunted, took a long shot at the cuspidor and said: "Call that there boy back. I don't like his manner. I believe he did do it."

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CONTENTS

PAGE

Writing History by the Telegraph. By R. F. Easson 340

The Candler System. 343

Death of Benjamin G. Lamme, One of the World's Foremost Electrical Authorities 344

Telephone Exchange Installation Beats Post Office Establishment 345

How to Balance the Quadruplex 346

The Application of Radio Engineering Principles to Submarine Telegraph Cables. By Major General Geo. O. Squier. Concluded from page 317, July 16th Issue.) High Powered Station 347

Re-Radiation Interference with Radio Reception. By S. M. Kintner 348

New Era in World Intercourse. Novel Telephone Uses. Facts about the Telephone 349

Few Civil War Telegraphers Left to Tell of Old Times 350

General Harbord Announces New South American Radio Plans 351

Editorial Comment—The Historian of the United States Military Telegraph Corps Visits Gettysburg Battlefield. Senator Marconi's New Appointment. Rail Telegraphers Get More Pay 352

The Railroad-Telegraph and Telephone Section of the American Railway Association. Coming Conventions. Radio Corporation of America 355

A Digest of Changes Between the 1921 and 1924 Tax Laws. By H. Archibald Harris. (Continued from page 326, July 16th Issue) 356

American Telephone and Telegraph Company. Theory and Practice of Public Utility Valuation 359

Postal Telegraph-Cable Company. Western Union Telegraph Company 360

Obituary. 361

The Late Joseph W. Kates 362

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Writing The History by the Telegraph

FROM THE FIRST THE TELEGRAPH SLOGAN WAS "RUSH"—MR. EASSON TELLS AN INTERESTING STORY OF ITS POWER, STRUGGLES AND GROWTH

BY R. F. EASSON

WHEN the battle of Waterloo was fought and the aspirations of Napoleon to dominate Europe forever were crushed, news of the great event was brought to Great Britain by a swift sloop. It was some hours after the struggle that the people of London knew that a decisive victory had been won. It was some weeks before the colonies of British North America were to learn of the news.

How different was the case when the last world-war came to an end! Scarcely had the German High Command sought an armistice than the news was spread the world over. By cable and by telegraph it was sent to the far end of every continent. The news of an armistice was flashed to Alaska and Australia in a few minutes; it was hours before the victory of Waterloo was known though the battle was fought just across the Channel.

It is true that the world has changed materially since the Waterloo was fought; that a new epoch in history had opened and closed; and that things which are commonplace today would be thought miracles in the time of the first French Empire. But despite all these things Waterloo is not remotely removed from the telegraphs. The Duke of Wellington was the victorious general at the decisive battle and when he died I copied the despatch announcing his death as it came over the wire to Toronto. A few weeks later I copied the description of his funeral and interment in St. Paul's.

Every big international event, every national event of importance, which is featured in the daily press comes into newspaper offices over the telegraph wire. It would be difficult today fully to appreciate the appearance of the morning paper without its telegraph services. I speak only of the newspaper end of the telegraphs' activities in this article, for I purpose to write something of the "big stories," to use a technical term in newspaperdom, which at one time or another I have despatched or received over the wire.

But first, let me try to picture the appearance of the morning paper without the aid of the telegraph to bring news to its columns. Local events, accidents, meetings and other daily happenings, which ordinarily receive a scant paragraph, would be featured as big as possible; then the exchange editor would get busy with his paste-pot and shears. He would clip and send up to the composing room articles and stories that under present conditions would find a speedy place in the waste-paper basket. But what of the big world events of the day? There would be none. A crisis that might shake the nations of Europe to their foundations would never be mentioned; a disaster that snuffed out the lives of thousands would remain unknown; kings might die and thrones might fall and ninety per cent. of the world would remain in utter ignorance of the news for hours, days or even months. The press would be thrown back to its pioneer period of a century ago.

When I began my life's work with the telegraphs, seventy-five years ago, the press of that day was in the infancy of its fast news service. The telegraph was at its disposal but the cable was not. There was still the long wait to get overseas news and to the editor and reader of the twentieth century the speed which was made to bring news to the inland centres must have seemed pitiful, indeed. There was the long sail across the Atlantic, sometimes taking from four to six weeks, and then the rush to speed the news these packets brought to the Canadians over the telegraph wire.

When I entered the service of the old Montreal Telegraph Company, as its only messenger boy in Toronto, in 1849, I remember that the all-absorbant topic of conversation during my first days of service as the Magyar rebellion against the newly-crowned Emperor Francis Joseph of Austria. Hungary rebelled and Austria, with the help of Russia put down the rebellion; and a number of executions followed. Scarcely had this choice bit of news finished before the British East India Company annexed Punjab. This was a great event at the time.

In those days the telegraphic system was crude to what we have today. There was only one wire between Montreal and Toronto. There was also only one operator at Toronto; he was manager, operator and clerk. He had a staff of one, the messenger boy—myself. And he was not rushed by work, either. At the most there were only ten or twelve messages a day, for tolls were high. A ten-word message to Montreal cost three shillings and nine pence; to Quebec, four shillings and six pence. As money was much dearer than it is today there were few who could afford to use the wire. I recall that the officers of the permanent force, at the old fort, were among our best customers and often I had to walk out there two and three times per day to deliver messages. As there were no cars or bicycles, I had no other alternative but to foot it. It was a long walk for a boy of twelve; but I used to amuse myself on the way by shooting snipe and plover.

Early the following year I went operating myself and though the tolls had been reduced, the use of the telegraph was slightly greater. My largest customers were grain dealers and shipping firms. The operator did not then transcribe messages by sound, but was forced to read from the dots and dashes which were printed by clumsy machines upon tape. When the market quotations used to come in and perforce, be read out for transcription, were it in summer or fall a crowd of grain dealers would gather about the open window and fight for a place of vantage so that they could hear the quotations for nothing. Sometimes real fistic encounters would take place, and many a dealer, in an effort to

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displace a more fortunately situated competitor, would have his clothing sadly ripped.

International news of the fifties was sent to the paper by the New York Associated Press, the forerunner of the Associated Press, Canadian Associated Press and other kindred organizations. But it did not come direct into the newspaper offices, as is done today. It merely came to Toronto in tape form and I had to read it out to the newspapermen in the office. Let me give a picture of how the press got its news at this period.

There was a long deal table. About it sat reporters from the various papers. As I recall the papers of that day, there was "The Globe," edited by Hon. George Brown; "The North American," edited by Hon. Wm. McDougall; and "The Colonist," edited by Hugh Scobie. On days of publication, for there were no daily papers in Toronto then, the editors would come to the office and crowd about the table as the news came in and I read it off the tape. Frequently, when there was some political news that would please him, Mr. Brown would give a "Ha!" of satisfaction. As all the editors did not see eye to eye in political matters there usually followed a hot and sometimes acrimonious argument across the table. In the meantime, the news, no matter how important it might be, would wait until one side or the other was utterly confuted.

There were times, however, when publication day of the papers came and passed and there was no news to come off the wire. That would be when there was a double break in it somewhere between Montreal or Buffalo. The telegraph companies did not have the same complete organizations as they do today. Besides being manager operator and clerk, I was also repair man for my stretch of territory. From Montreal to Toronto we had offices at Cornwall, Prescott, Brockville, Kingston, Belleville, Cobourg, Port Hope, Bowmanville and Oshawa. My territory, in the east, ran halfway to Oshawa; on the Buffalo line half-way to our first station at Oakville. When misfortune dogged my steps and both wires would go out of commission, then Toronto would be completely isolated, so far as telegraphic communication was concerned.

It was while I was doing my first stretch of duty at Toronto that the line "By Our Own Correspondent" appeared in any Toronto paper. "The Globe" was the pioneer in this phase of news gleaming and the first correspondent was stationed in Montreal. Owing to the high tariff these messages were naturally short and originally they contained mostly market quotations, with a few words upon the more important news of the day in that city. Subsequently the special correspondent idea spread to the other papers and as the length of the messages increased there was little slack time in the office.

Much of the news sent by correspondence gradually came to be of a political nature, and when Hon. George Brown was in the heat of an election campaign in York, I have frequently been kept at the office overtime to send out stories of his campaign. The same often happened in Kingston when his great opponent, Sir John A. Macdonald, was in the midst of a similar battle. Apart from the work it entailed, I welcomed these contests. They made a good financial showing in my reports for the month.

It was my good fortune to open the telegraph office at Father Point, on the St. Lawrence, in 1859. This was the news-receiving station, which was to rival that of New York, as a point for sending out news to the United States and Canada. It was situated in a lighthouse and I was lighthouse-keeper, operator, and agent all in one. As the trans-Atlantic packets would sail up the dock, the purser would throw off a tin cylinder, with a red flag attached to it and my press boat, manned by two ex-sailors, would row out, pick it up and rush back to me. Inside the cylinder would be three manifold copies of European events, written in London just before the boat sailed. According to present-day standards it would be pretty late news; but to us it was last minute, "must" stuff. This I used to put hot on the wire to the New York Associated Press and then supplement it with further details as gleamed from the papers which the purser subsequentlty brought to me.

It is a curious fact but the first item of news I sent from Father Point was declaration of war between Austria and Sardinia. Subsequently France joined Sardinia and the interest in the struggle became intense throughout lower Canada. Every time a packet arrived, people would come up to the lighthouse to find out how the war was progressing. War and rumors of war then, even as now, occupied much of the people's conversation.

And the public were to be sated with news of war before peace again was to come upon the world. But a year before I was busy transcribing news of the India Rebellion and a year later came the capture of Pekin and the overthrow of Naples by Garibaldi. The effort to unify Italy was still a news topic when the American Civil War commenced. Maximilian of Mexico was executed and Napoleon III, of France, abdicated in the face of an overwhelming defeat by the Prussians, before all mention of war was to vanish from the news despatches of the day.

I have often been asked which of the many news despatches I sent or received left the most outstanding impression upon my memory. It is simple to answer. There are only two stories that I took over the wires which I can distinctly recall as to time, place and incidents connected with their receipt, although I have received despatches dealing with great battles, the fall of empires, stupendous disasters and the shattering of financial kingdoms. But an operator soon reaches the mental condition where he receives news automatically; it is a

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part of the day's work; it may leave an impression upon his mind at the time but it is an ephemeral one. Probably, the fact that the two despatches in question remain vivid in my mind is because one concerned a man for whom I had the greatest of personal admiration; while the other was outstanding because it contained what is known in newspaper parlance as a "scoop." In other words, this despatch which I received, contained dramatic news published in no other newspaper in Canada, beyond that to which I sent it. In both instances death played the leading role—one was the shooting of President Abraham Lincoln; the other the murder of the Hon. Thomas D'Arcy McGee.

It is a curious coincidence that both of these assassinations should have taken place in the month of April, although they were three years apart. On the early morning of April 15, 1865, I was sitting by my machine, copying out the various news items of the day (we had long since outgrown the old method of reading the press news to reporters from the tape) when a "flash" came over the wire to this effect, "Washington, April 15, 12.30 a.m., The President was shot in the theatre tonight and is perhaps mortally wounded."

I at once notified the editors of the sensational news and Gordon Brown a brother of the Hon. George Brown, came over to the office immediately and sat beside me while details of the shooting were received. He also wrote a leading editorial upon the crime for the paper while he was waiting. That morning, after my trick was over, he and I walked home together and he spoke in glowing terms of the many fine qualities of the dying President. Abraham Lincoln died the following morning at 7 o'clock.

It was early in the morning of April 7, 1868, that I received news of the murder of the Hon. Thomas D'Arcy McGee, Minister of Agriculture for the Dominion House. I had already received my "Goodnight" from Ottawa and was about to close up and leave, when I heard an insistent call for my office. I answered and a despatch for "The Leader" commenced, giving full details of the shooting of D'Arcy McGee by a band of Fenians, just as he was about to enter his home after having delivered a notable speech in the House of Commons. As the murder took place quite early in the morning, "The Leader" was the first paper in the Dominion to carry the news. Subsequently, I learned that "The Leader's" Ottawa correspondent lived quite close to D'Arcy McGee and, therefore, was able to score an outstanding "beat" in Canadian journalism.

Of the many despatches, which I sent during my years as an operator but one remains vividly in my mind and possibly this is because there was an element of friendship, coupled with admiration, tinging the whole affair. In this case, I refer to the shooting of the Hon. George Brown, proprietor of "The Globe," by a discharged employee and his death some weeks later. It was a crime which created a tremendous sensation at the time, for, although Senator Brown, as he then was, had many political enemies there was no man who had more warm friends. Fearless, tolerant and a man of sterling honesty, he was a giant in the political arena, but in my press room a no more genial gentleman could be found. He loved a joke and often in the old days, when an argument waxed hot and one of the rival editors was giving him a thorough verbal trouncing, there was a twinkle in Mr. Brown's eyes which showed that he thoroughly enjoyed the whole affair. And I have never known him to give less than he received in return; usually he was most generous and gave much more. Indeed, he was a hard man to beat in those little impromptu debates staged about the old press table.

It would be impossible within the compass of one article to give more than the most sketchy sketch of some of the big news despatches which came over my wire during the years I sat at an operator's instrument. It would cover a vast field in the making of history and the progress of mankind. When I commenced work for the Montreal Telegraph Company even lamps were unknown; candles were in general use. When word came that the first cable had been successfully laid across the Atlantic, in 1858, the whole city was illuminated. Our office was among the best of them. We took planks, nailed them in front of the windows and set row upon row of candles upon them. The cable proved to be a failure but the illuminations were pronounced to be "wonderful." Yet how small and puny were efforts when compared to the electrical displays that could be made today!

There were many other events which were looked upon as "wonders" back in the old days, which would seem crude today. But then it must be remembered that science and invention were in their infancy. The world stood upon the threshold of a new era in development but the door was as yet closed. I can recall very clearly the building of the first steam engine in Toronto and of its triumphant parade down Yonge Street. It was one of those old wood-burners and when compared to the giant "6000" type of passenger engine which are now used on the fast Canadian National Railways' passenger trains would seem a veritable pigmy in comparison. But back in fifty-three when it came new from the shops there was great excitement in the city.

The engine, as I recall it, was named the "Toronto" and it was built in the iron works of James Goode, whose shops were then at the corner of Richmond and Victoria Streets. When the day came to give it the trial run men were busy laying wooden rails along Richmond Street and down Yonge to the tracks of the Ontario, Simcoe, Huron Railway Union Company. Then the engine appeared, new in its shiny coating of paint, varnish and gold. It was "pinched" along the improvised

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wooden rails and accompanied by a crowd of cheering men, women and boys it was drawn to the depot. The "Lady Elgin," which, I believe. was built outside of Toronto and brought to the city by boat, was engine No. 1 and the "Toronto" was engine No. 2 on the run. The "Toronto" was the engine which pulled the first passenger train into Aurora. Subsequently the road was taken over by Northern Railway and this in turn was later absorbed by the Grand Trunk System.

During the course of years since I first touched the operator's key many figures and events which once loomed large have been forgotten or relegated to the pages of history. The Duke of Wellington is but a shadowy figure of a glorious past. When one mentions the "Iron Duke" one's thoughts are apt to flit to the super-dreadnought of the British Fleet, a fitting memorial to a great fighter; even the British Navy itself was in a period of transition from the days of Nelson when I started operating. Then there is another figure of immortal fame, whose name flashed across the screen of events in those days—that of Florence Nightingale, the pioneer of Red Cross work, who did so much to alleviate the sufferings of the soldiers during the Crimea War. As for the advance of science and commerce, the various despatches I received dealing with these would be impossible to cite. There was the coming of the railway to Upper Canada and, incidentally, coupled with it the passing of Weller's Stage. I believe that I am the only man living who has ridden in this famous coach. Close upon this despatch was that which announced the discovery of chloroform, a mere paragraph, filled with doubts; but what a boon it has proved to mankind. Yet it did not receive as much press attention at the time as did the first tram to be run in London!

Could one but go back into memory's archives and brings forth a chronology of world events, particularly as it would apply to press chronicling of them, what an interesting work could be written. I believe that it would be found the first rumbling of their approach would be faint. Only a brief paragraph gave an inkling of the Crimea War; a few words announcing the mutiny of an Indian regiment ushered the great India Mutiny into the news columns; and the telephone was declared to be an impossibility. But what would the world do today without it!

It is a long road from candles to electric lights and from stage coaches to aeroplanes, but I am happy that I have travelled it. The period was an interesting one. It marked the world's greatest strides in the annals of mankind and in no place could one keep in closer touch with the march of events than at the key of a press telegraphic instrument. I commenced work with the Montreal Telegraph Company, later it was absorbed by the Great North Western and this in turn was taken over by the Canadian National Railways; and the single wire system that I originally knew has grown from a line of 334 miles into a system which has direct connections the world over. It is but an illustration of the tremendous progress made by the world that I have been privileged to watch during my lifetime as an operator.

But what of the future? What will the boy of today think when he has travelled past his eightieth milestone along life's highway?—*Canadian National Railway.*

—o—

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Death of Benjamin G. Lamme, One of the World's Foremost Electrical Authorities

BENJAMIN G. LAMME, Chief Engineer of the Westinghouse Electric and Manufacturing Company, and one of the world's leading electrical authorities, after a lingering illness of several months, died on July 8th at his home, 230 Stratford Street, East Liberty, Pa., where he lived with his sisters, Miss Florence A. Lamme and Miss Lenna G. Lamme.

George Westinghouse, with whom Mr. Lamme was closely associated until Mr. Westinghouse's death, had perfected the alternating current system, by which electricity could be transmitted over greater distances economically. Mr. Lamme then perfected railway and industrial motors and synchronous converters to make this alternating current useful at any point, and thus the use of electricity was removed from small, restricted areas and its use made universal.

His most spectacular achievements were the designing of generating equipment for the World's Fair in Chicago in 1892; 5000 h.p. generators, a world's record at the time, when Niagara Falls was first harnessed for waterpower; generating and motor equipment for the first big railway electrification, that of the New York, New Haven & Hartford Railroad; the present day single-phase alternating current, high voltage railway system, which is responsible for most of the railroad electrifications; the design of the most successful synchronous converter ever used; and the single reduction gear street car motor, which trough designed in 1890 is the type still used on street railway systems.

An outstanding trait in Mr. Lamme's character was his interest in young engineering students. For years he made a study of the young, technical graduates who entered the Westinghouse Electric organization, analyzing their abilities and characteristics to adapt them to the work to which they were best fitted. He maintained a design school for these men, in which he gave actual instructions, so that today the methods and knowledge of this great genius have been passed on to the vast Westinghouse engineering body and will stand as an inheritance to these engineers in years to come.

B. G. Lamme was born on a farm near Springfield, Ohio, January 12, 1864. He entered Ohio State University in 1883 and graduated in mechanical engineering in 1888, having been out of school during the year 1886-1887, on account of his father's illness and death. He had but little opportunity to study electricity, as there was no electrical engineering course at that time. He had, however, taken a great interest in the subject and picked up all the information he possibly could. He entered the employ of the Westinghouse Electric Company in 1889, at the princely salary of $30.00 a month.

The design of motors and generators in those days was mainly a matter of "cut and Try", of experiment pure and simple. Albert Schmid, at that time Superintendent of the Westinghouse Electric, felt that electrical phenomena must be subject to natural laws just the same as materials are. So having heard of young Lamme, whose greatest delight was to "figure," he gave him the task of trying to discover these laws and devise methods for calculation of electrical machines in accordance with them. His success in that line might be described as the foundation for the success of the Westinghouse Electric Company and it has influenced and exhilarated the development of electrical apparatus the world over. His success is also attested by the fact that more than 150 patents have been granted to Mr. Lamme, individually.

Scarcely six months after entering the employ of the Westinghouse, Company, he calculated the electrical design of the double reduction gear railway motor which was put on the market early in 1890. This was very similar in design to others that were in use at that time, so that his work showed little more than an ability to calculate the magnetic circuit and for determining the saturation curve.

In the summer of 1890, however, Mr. Lamme began work on the design of a street car motor with but a single gear reduction. This was the forerunner of the celebrated Westinghouse No. 3—a motor that set a standard for street car motors that still persists. It was radically different from anything that had appeared previously, and its success when put out early in 1891, was instantaneous.

At this same time, he was working on direct current arc machines and alternating current generators, making improvements in the latter which increased their output by 50 per cent. In 1892, he began work on the induction motor and produced the first successful distributed winding motor of this type. In 1892, Mr. Westinghouse took the contract for lighting the World's Fair. Great polyphase generators had to be designed for this purpose and Mr. Lamme did the work. He also designed the synchronous converter, large induction motor and other machines which were exhibited at the Fair. At this same time, he was designing railway generators whose performance was the boast of the Westinghouse Company.

Then came the Niagara Falls power development, for which Mr. Westinghouse took the contract for the electrical apparatus. The huge umbrella type generator rated at 5000 hp. each, were calculated to a nicety by Mr. Lamme, and the machines were a great success.

About the year 1895, Mr. Lamme conceived the idea that led to the development of the well known type—C—induction motor with the squirrel cage rotor. Engineers still marvel at the type C motors and also at Mr. Lamme's paper on induction motors, which is a recognized classic.

His great work on the synchronous converter, however, he regarded as one of his greatest achievements. For years, he fought the battle for the syn-

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hronous converter almost single-handed. He won ut, as usual, and this is now the accepted ma- hinery for converting alternating into direct cur- ent.

Then came his conception of the single phase lternating current railway system. He had long eld the belief that the success of heavy electric ailroading lay in the use of a high voltage alter- ating current on a single overhead trolley. He elt that the simplicity and advantage of this sys- em with its simple sub-stations containing noth- ng but lowering transformers and with no atten- lants required, were so great that it must come. The main difficulty lay in finding suitable ways and neans for utilizing the single phase alternating cur- ent. After several attempts, Mr. Lamme succeeded n designing a series commutator type of motor with suitable characteristics, which he described along with the system of power distribution in his famous paper before the American Institute of Electrical Engineers.

The paper created a furore of excitement all over the civilized world and soon every electrical manu- facturer was working madly on the problems, and a dozen types of motors were on the market. Mr. Lamme never pinned his faith solely to the com- mutator type motor, although that is the type that has been most used. He maintained that one of the great advantages of the system lay in the fact that several different types of equipment could be used, all running under the same trolley.

It would seem that the actual design work in con- nection with all these different types of apparatus and the innumerable other machines with which he has been connected, would have been more than he could handle, but they constituted simply his reg- ular work. He seldom took any of this work home with him, but for fifteen years, his chief recreation consisted in working and studying over problems and methods of design, spending from 3 to 5 hours every night on them.

Mr. Lamme had very simple tastes and few fads outside of his business, but when he took up a fad, he went to the limit with it. While on a trip to Europe he bought a kodak with which he took sev- eral hundred very good snapshots. Having thus become interested, on his return he took up photo- graphy in earnest and did not slow down until he had a complete outfit of cameras, fine lenses, tele- photo attachments, ray filters, enlarging outfits and everything else that the best amateur could possess, and had taken thousands of fine pictures.

How he succumbed to the charms of the auto- mobile is equally interesting. It started in 1916, when he bought a car, chiefly for the benefit of his sister who had been ill for several months. He became so interested himself, that he drove the car 9000 miles in the first six months.

He was a great reader, having a particular fond- ness for the wildest, weirdest, most imaginative tales he could find. His collection of such books is one of the best in the country.

He also had a great fondness for puzzles and would work for years, if necessary, to solve one.

Mr. Lamme was not a prolific writer, but when he did write, the engineering world sat up and took notice. He had the happy faculty of being able to put his thoughts on paper so that anyone with the rudiments of the subject could understand them. One of his greatest assets was his ability to get a physical conception of every problem and he aimed to give that in his paper. He seldom wrote mathematical papers, although not for lack of ability but he regarded mathematics as his tools that were to be put away when the work was done. Consequently, his papers are in great demand and are very widely read.

Mr. Lamme has received the highest honor from the American Institute of Electrical Engineers, in being elected one of the two members from that body on the Naval Consulting Board during the War and being chairman of the inventions committee on that Board. In 1919 he was also awarded the Edison Medal by the American Institute of Electrical Engineers for his engineering achievements. All of these were in consequence of his work and ability as an engineer—he was in competition with engineers only. When the Board of Trustees of Ohio State University awarded him the Joseph Sullivan Medal, it was a recognition of the value of his work to the world.

Telephone Exchange Installation Beats Post Office Establishment

In the "oil belt" new towns spring up over night and it is not long before service is demanded. In Cromwell, Okla., a telephone exchange was in operation before Uncle Sam opened a post office.

Early last month, J. J. Cromwell, for whom that growing oil town was named, pulled the switch that opened the new telephone exchange. R. J. Benzel, general manager, and other officials of the South- western Bell Telephone Company, were there from Oklahoma City to attend the opening. The entire exchange was built and placed in operation by the Southwestern Bell Company, in seven working days. There were about 30 subscribers on the opening day.

The switchboard and inside equipment were rushed from Oklahoma City, the cable and four- room office were trucked from Tulsa and the poles were brought from Shawnee.

The Southwestern Bell Company had previously built a toll line from Wewoka to Cromwell.

Dewey New Head of Federal Telegraph

Fred L. Dewey has been appointed manager of the Federal Telegraph Company in Los Angeles, to succeed Theodore E. Nivison, who has been pro- moted to the sales department of the company, with headquarters at San Francisco. Both men are well known to the company's patrons in Los Angeles and San Francisco.

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How to Balance the Quadruplex

THEORETICALLY, a quadruplex balanced in the same manner as the polar duplex should suffice for both the first and second sides, and in fact too many of those detailed to look after the apparatus consider their work finished when such a balance has been obtained.

In practice, however, this is not sufficient to obtain the best results. Even the careful adjustment of the No. 2 relay afterwards, although helpful, must necessarily be experimental and uncertain.

There is something that interferes with the evenness of the incoming signals produced by the distant battery, aside from the period of "no magnetism" heretofore explained, and that something is an excess of magnetism in one coil of the neutral relay over and above that in the other coil. Now, if all relays were perfect both in ohmic resistance and magnetic density, we should have but little trouble, but, unfortunately, they are not. When new they pass a regulation test and give satisfactory results, but, like all mechanical devices, they are liable to deteriorate more or less. A stroke of lightning or an accidental excess of heat may burn the insulation around the wire of the coils and cause a few of the convolutions to be cut out. The damage may be very slight but it will cause an inequality in the density of the magnetic lines of force urged into the iron core by the two currents from the home battery, although flowing with equal strength in both the main and artificial line coils. In other words, if an ammeter showed that the strength of the current flowing in each coil of the relay was of identical value, the magnetism in the home relay, produced by the current in the defective coil, would be somewhat less than that in its side partner, because there would be a less number of convolutions of wire. Hence the excess of magnetic energy in the stronger coil from the home battery would antagonize the incoming signals. This must not occur. All text-books state that the current should flow equally through each coil, but what they really mean is that the magnetic energy in the two coils must be of equal value.

This means that in balancing a quadruplex having a slightly defective polar relay and a normal neutral relay, in the manner stated, the result would be that in order to magnetically equate for the polar relay more current must flow through the weaker coil than the other. This inequality of current can only be obtained by a corresponding difference in ohmic resistance of the main and artificial lines. It follows, therefore, that a balance under the conditions named must necessarily be false. If false, the evenly wound neutral relay will receive more current through one coil than the other as its two coils are in the same path as are those of the polar relay, and are fed by the same currents. As the same rule applies to both relays the excess of current in one coil of the neutral relay interferes with the incoming signals in a like manner.

It must not be supposed, however, that the defective polar relay is to be met with so frequently that the writer champions a deviation from the old text-book rut, but because there are so many conditions continually arising on the various circuits, that a practically similar condition actually exists in a greater or less degree. The true reason for suggesting a change is the plausible one that whether such conditions arise or not, the neutral relay is the weaker instrument, and attention should be devoted entirely to it even at the expense of the polar side, if necessary, as the latter instrument can dispense with a large proportion of its working margin without disadvantage. To attain the highest degree of efficiency, the writer, therefore, suggests the following plan for balancing a quadruplex:

1. Ask the distant office to ground, and after the home office has done likewise, center the armature of the polar relay, cut in and balance in the usual manner, if desired.

2. Cut in and close the key on the second side. Tell the distant office to "cut in" and "dot" on the second side only.

3. Pay no attention to the polar side, but consider the No. 2 relay and the polechanger an ordinary Stearns duplex set, and proceed with the balance. In other words, while the distant office is "dotting" on the second side only, turn the retractile spring of the neutral relay down to make it as sensitive to interference from the home battery as possible, and proceed to adjust the rheostat until the key controlling the polechanger can be opened and closed without its having the slightest influence upon the incoming signals.

4. To eliminate the static, ask the distant office to close his key on the polar side and keep his No. 2 side open. This places the local contact points of each home relay in their most sensitive position.

5. Turn down the retractile spring as before and, devoting attention to that instrument alone, adjust the condenser and retarding coils until the home reversals fail to produce a kick.

6. Ask the distant office to "write" on the No. 2 side while he "dots" on the other; then adjust the retractile spring to the signals as in the case of a single relay.

This method is not an entirely new one. In fact the plan has been more or less followed by quadruplex experts for years. The superiority of such a balance over the old method may be easily verified. If any reader is doubtful let him first carefully balance by the old method and after satisfying himself that he has done all he can, then turn down the spring on the No. 2 relay as described, while the distant office is sending. If it is not found that the home reversals interefere more or less with the incoming signals, the circumstances will be remarkable.

As to eliminating "static" by the method suggested, the verification lies in the fact that the "kicks" invariably disappear from the polar relay

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rst, thus proving conclusively that that instrument nust not be depended upon to indicate when your vork is done.

After having followed the instructions up to this oint, it is time to turn attention to the apparatus t the other end of the wire. This statement may urprise many readers, but it is a fact that it devolves upon the home office to determine and so notify the distant office when his transmitting apparatus is not properly adjusted and when his battery is out of order.

PROPER ADJUSTMENT OF APPARATUS.

It requires considerable experience to adjust nicely, but one of the safest guides is to set the contact points of all transmitting apparatus as close together as they will work without "sparking" and give the spring a tension that will not cause a jar as the armature rebounds. At the same time see that the levers work freely in the trunnions without destroying the good contact. The "down stroke" of all armatures should be slightly stronger than the "up stroke."

Above all things see that the spring on the polechanger does not cause the lever to tremble or vibrate when released by the local magnet, and remember that the closer the polechanger points are brought together, the better will the man at the other end get the home signals on his neutral relay.

The Application of Radio Engineering Principles to Submarine Telegraph Cables

By Major General George O. Squier,
United States Army.

(*Concluded from page 317, July 16th Issue.*)

SUMMARY

1. After over half a century of experience with ocean cables during which time every refinement has been introduced that skill and ingenuity can devise, we are at present entering a new phase of cable development which will give ultimately a speed and accuracy unthought of at present.

2. The basic engineering principles and instrumentalities, which have made radio the marvel of the age, will be adapted and applied to the sub-audio band of frequencies wherein principally lies ocean cable practice.

3. Signal Corps developmental work in connection with the new Seattle-Ketchikan cable, carried out during the past year at the laboratory of William M. Bruce, Jr., at Springfield, Ohio, in accordance with a Key Plan based upon radio engineering principles applied to ocean cables has resulted already in marked progress.

4. A universal automatic telegraph transmitter, applicable to radio, land lines and submarine cables, has been developed and tested over an artificial cable in the laboratory.

5. An improved form of rectified received record has been devised and tested.

6. With funds furnished by the Signal Corps of the Army, the National Bureau of Standards has been engaged for some time in searching for a substitute for gutta percha. The construction of ocean cables with distributed inductance by means of the recently developed material, "permalloy," will furnish a new impetus to cable manufacture and will contribute to increased speeds and multiplex operation.

7. As in radio, the electron vacuum tube will play a dominating role in this new development. Amplification by several stages of the received cable signals, as in the present radio broadcasting service, will open up an entirely new range of cable efficiency. With properly designed signals, this amplification has been shown already in the laboratory to be practicable.

8. There is no real social or economic conflict between ocean cable and radio telegraphy. The one is essentially a point to point two-way service between individuals, the other, at present, at least, is essentially a broadcasting one-way service depending upon mass appeal. Each has its own natural field of usefulness in the development of world traffic. The logic of events will eventually place each service in its proper sphere.

9. Economically a cable company is no more than a factory, where the output for sale to the public consists of sheets of paper upon which are words and sentences.

10. This type of factory is unique in that the outstanding items of annual expense are the interest on the cost of the cable, the replacement sinking fund, and the maintenance of a cable ship as insurance against interruptions. Unlike the ordinary factory, there is no deterioration of the plant due to wear and tear of the electrical signals produced, and the cost of the electrical energy required to operate this factory is a negligible quantity.

High Powered Station

The British Broadcasting Company's high-powered station at Chelmsford opened for experimental work on July 23rd.

The hours of transmission provisionally fixed are 11.30 a. m. to 12.30 p. m., 4 to 5 p. m., and 7.30 to 8.30 p. m. The morning and afternoon programmes will be mostly speech, but it is hoped that some music will be played during the evening programmes.

The wave-length will be 1,600 metres. The power will be announced later; it will not be less than 15 kilowatts. The call sign is 5 X X.

Listeners are invited to listen for this station and write to the British Broadcasting Company, 2 Savoy-hill, giving details of their results. It is particularly requested that reports should be concise, and the real interest lies in the extent of the crystal ranges.

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Re-Radiation Interference with Radio Reception

By S. M. Kintner, Manager, Research Department, Westinghouse Electric and Manufacturing Company

Interference, its causes and results, is now a most popular topic of conversation among radio fans. Interference from one cause or another has been experienced by every radio fan, but few of them know the real reasons for this trouble and how to take measures that will assist in reducing it.

These interferences are caused by: (1) Another broadcast transmitting station so close or so powerful as to make it difficult to "tune out"; (2) Another transmitting station operating on a wave length so near to the one being received as to cause interfering beats at a beat frequency which is sufficiently low to bring it within the audible range; (3) A nearby amateur transmitting station operating on a spark set, or an alternating current tube set; (4) Atmospheric disturbances, called "static" are particularly apt to be present during the summer months and (5) the interference caused by "birdies" so-called on account of their supposedly bird character of sound. While there are times when quick "tweet" sounds may be heard, I have always thought that the "howling of winter winds" or the "wail of lost souls" was more truly descriptive of the sensations produced by this type of interference.

As "birdies" is the interference produced by one listener with another I will direct your attention to it in order that you may better understand the cause of it and adopt a plan of tuning which will cause you to interfere with your neighbor as little as possible. Remember that a radio listener tuning in late on a program can be just as much of an annoyance to those near him as can one arriving late at the theatre in the middle of an act when carelessly stumbling over things and making a lot of unnecessary noises while finding his seat.

An antenna at a receiving station re-radiates a certain part of what it picks up. This is true, in varying degrees, of all such antennae. When, however, one permits their detecting tube to oscillate, which is done by too much tickler, the radiating tendencies of their antenna are increased many fold. When the tube is oscillating the receiving station becomes a transmitting station sending out waves of frequency at which the tube is oscillating.

As the tube oscillation frequency is controlled by the tuning of the set it is apparent that when the tuning of the set is changed while the tube is oscillating that the radiations sweep over that band of waves just like the note of a siren is changed as its speed is altered.

This sweeping across a wave to which someone else may be listening causes this kind of interference with them, if they are within about a mile of the offending party. In the majority of instances the operator of such a set is unaware that he or she is causing such disturbance.

It is hard to believe that anyone would knowingly drag across the various wave bands to find the beat of the carrier wave of the desired station any more than one would drag their arm over the heads of the occupants of seats in a theatre in order to more easily find an empty one. Each act is equally rude although the radio tuner may for a time be excused on the score of ignorance.

The care that need be exercised in tuning to avoid annoying your neighbor depends upon where you live. If you are in the country where radio receiving sets are miles apart, little or no thought need be given to this as a possible cause of interference with some one else. If, however, you are in a city where there are many radio receiving sets near you, you should, as an act of courtesy and consideration, use every care against tuning while your tube is oscillating.

You will want to know two things in your efforts to carry out such a plan of tuning; (1) how to know when your tube is oscillating and (2) how to find the distant station, for this whole practice is associated only with hunting such, without the tube oscillating.

You can always tell when your tube is oscillating by a peculiar change that takes place at the beginning of oscillations. There is a slight swish or rustle as the tickler reaches the oscillation position and it should be backed slightly below this point.

Your search for the distant station should always be made with the tube near to, but always below, the oscillating point and the tuning can then be done with no inconvenience to anyone. You will recognize the distant station by the sounds of the music or speech, if in operation, or by a slight noise of the transmitter if you chance to hunt it during a quiet period but with the normal antenna radiations unmodulated, going out.

There is a mistaken popular impression that the single circuit sets are the real offenders in this trouble and that sets having two circuits are immune from it. Such is not the case, as repeated tests have shown. A two-circuit receiving set with the tube oscillating in the second circuit, when properly adjusted to receive the maximum strength of signals, will act as a radiator of signals to just the same extent as the single circuit set.

That such a condition should be expected, is apparent when we remember that the largest and most powerful transmitting sets are constructed with two circuits arranged in exactly that manner.

The advantage of regeneration in the antenna is very great in attaining distance and, if kept below the oscillating point of the tube, causes no disadvantage to others.

The British broadcasting service was started with a strict prohibition of regeneration but it was soon found that this imposed a hardship that was unnecessary and at present regeneration below the oscillating point is permitted.

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The particular point that I desire to make, is that the practice of hunting a distant station with the tube oscillating is impolite and that there is no difference in this respect, between a single and a two circuit set.

New Era in World Intercourse

MR. MARCONI'S beliefs are based on two recent achievements with the method by which short wireless waves are projected in a beam in one direction only, instead of being allowed to spread all around.

Intelligible speech was for the first time transmitted from Poldhu to Sydney on May 30. Perfect Morse transmissions were also made on several days between 5 and 9 p. m., Greenwich time, and between 6.30 and 8.30 a. m.

Between June 12 and June 14 very strong signals were received for over ten hours each day at Buenos Aires from Poldhu, although the arrangements were far from perfect.

It is believed that with the new system an Argentine station will handle in six hours double the traffic now handled in twenty hours with the present super-power station.

"All these results," said Mr. Marconi, "many of which have greatly exceeded my expectations, convince me that by means of this sytem economical and efficient low power stations can be established which will maintain direct high speed services with the most distant parts of the globe during a considerable number of fixed hours per day.

MORE WORDS

"I am further of the opinion that by means of these comparatively small stations a far greater number of words per twenty-four hours could be transmitted between England, India, and her distant Dominions than would be possible by means of the previously planned powerful and expensive stations.

"Another particular advantage of this system should not be overlooked. As distant stations situated only within a certain angle or sector of the beam are enabled to receive, this condition brings about a comparative privacy or secrecy of communication unobtainable with any other system of radio communication, and this may prove to be of the greatest value in war time, besides considerably increasing the number of stations it will be possible to work by reducing the possibilities of mutual interference between them.

"The comparative economy in capital cost of these stations, the small amount of electrical power which need be employed with the capability of working at very high speeds, should make it possible to bring about a substantial reduction in telegraphic rates. The importance of this to the Empire must be obvious."

Mr. Marconi gave interesting details of his latest experiments. In those carried out between Poldhu and the yacht Elettra he observed:—

That the day ranges proved to be reliable and not inconsiderable.

That the night ranges were much greater than any one anticipated.

That intervening land and large portions of continents do not present any serious obstacle to the propagation of these waves.

DARKNESS PREFERRED

He proved that the wireless beam always seeks darkness to travel through, and chooses the path of least sunlight, even though the distance is longer. In tests between Australia and Poldhu he found that when the Atlantic and Pacific were in shadow the signals followed a route across them, a distance of more than twelve thousand miles. When darkness covered Asia and the East the waves followed the darkness over a route of nine thousand miles.

In an interview with a "Daily Express" representative after the lecture,, Mr. Marconi expressed his convictions in no uncertain manner.

"We are on the eve of even greater discoveries in the realm of wireless telgraphy," he said. "The results obtained and announced to-day will probably be epoch-making in the sphere of wireless."

Novel Telephone Uses

A TELEPHONE line installed in the Benwood mine in West Virginia, has been assigned to the use of the rescue crews and has aided greatly in their work, since they are now able to communicate with the outside without delay.

A Tulsa (Okla.), concern recently held a sale at reduced prices by telephone only. Many customers who visited the store expecting to benefit by the bargains were told that their orders would not by filled unless given over the telephone.

A new device has been perfected whereby divers can communicate over a telephone line with those above. This is done not by the voice itself, but by external movements of the throat. Every throat movement, as transmitted to those above, is transformed into the sounds of a voice reproduced with clearness, but not affected by the noise of pumping operations.

Facts About the Telephone

An average of a million conversations a day are now carried on over the telephone in the city of Detroit.

The American people, who number but 6 per cent. of the total population of the globe, have 63 per cent. of all the telephones in the world.

Dallas, Texas, has in proportion to its population, over four times as many telephones as has London, and over 25 times as many as Naples, Italy.

Among the forty-eight states that make up the United States of America, there are twenty-six, each of which has more telephones than the entire kingdom of Italy.

In proportion to the population, Milwaukee has twice as many as Berlin, three times that of London or Paris, and eight times that of Rome.

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Few Civil War Telegraphers Left to Tell of Old Times

TELEGRAPH operators who served the Government as members of the United States Military Telegraph Corps in the Civil War numbered about 1,500. Today only seventy-seven of them are registered on the rolls of the association of survivors, which is to hold its annual reunion in New Orleans next October.

The dean of the civil war telegraph operators is David Homer Bates who is summering in Allenhurst, N. J. When in the city Mr. Bates lives at the Hotel Ansonia. He was manger of the War Department telegraph office and cipher operator from 1861 to 1866. Mr. Bates is the only survivor of the four cipher operators stationed at Washington during the war.

There were no telegraph connections in the White House at that period, and when President Lincoln wished to hear from his armies in the field or to send orders or inquiries to the generals at the front, he would walk over to the War Department Building. Thus it happened that for four years Mr. Bates saw Lincoln almost daily, for in that period the President spent more time in the War Department telegraph office than he did in any other place except the White House.

One of the cipher operators in the office had met Lincoln in Illinois during a political campaign before the war, and at Lincoln's request had explained the principles of the telegraph. He was deeply impressed at the time by Lincoln's interest in this comparatively new development of electrical science. Lincoln, encountering his former preceptor in the War Department several years afterward, gave him a hearty welcome.

The War Department telegraph office was a convenient retreat for Lincoln, and he often spent hours in this haven, safe from "the pestering office seekers," as he once told one of the operators. Here he wrote the first draft of the Emancipation Proclamation, seated at the desk of Major Thomas T. Eckert in the cipher room.

At critical periods of fighting the President would lean over the shoulder of the operator taking the dispatches and when the cipher was being translated he often followed the process word by word. His custom on entering the room was to go to the file of translated telegrams and, starting where he had left off the previous day, he would go over every dispatch carefully until he had completed the sheaf. Then he would write out in his own hand the messages he wanted sent, seldom dictating them, but putting them into neat written form for transmission.

At the outbreak of the war Andrew Carnegie, a telegraph operator earlier in his career, was Superintendent of the Pittsburgh Division of the Pennsylvania Railroad, under Thomas A. Scott, vice president of the system, who became Assistant Secretary of the War. On April 22, 1861, Carnegie ordered Bates and four other telegraph operators to Washington for service in the United States Military Telegraph Corps. The first time Mr. Bates met Lincoln was when he delivered to the President the message announcing the shooting of Colonel Elmer E. Ellsworth of the Fire Zouaves, the Eleventh New York.

The cipher code used throughout the conflict was drafted by Anson R. Stager and was developed by Thomas T. Eckert, later President of the Western Union Telegraph Company; Mr. Bates and others. When Charles A. Dana, as Assistant Secretary of War, went to the front, his dispatches to Washington often sent the cipher operators to the dictionary, for they frequently contained words not familiar to the ordinary eye.

The Confederates had a cruder cipher system, based on symbols, and Lincoln was interested in watching the translation of such of their dispatches as were intercepted by the Union forces.

The work of the Telegraph Corps is shown by the official report at the end of the war. From first to last 15,389 miles of field, land and submarine lines were built by the organization. Those pioneers laid the foundation for cipher and telegraph work in later wars. Nothing like it had ever been done before.

One of the most widely known telegraph veterans in the United States is Elias Wirt Hale Cogley, now living in retirement at Parkesburg, Pa., who passed through New York a few days ago on his annual summer trip to Montreal. Mr. Cogley will be eighty in December, yet his eyes are as keen and his cheeks as pink as when he was the Captain of the wire system of The Associated Press. Like many others of his craft, Cogley was under fire in the Civil War, although he was not technically in the service of the United States.

His first important service was at McConnellsburg, Pa., shortly before the Battle of Gettysburg. The war telegraphers were necessarily at or near the front, and their most arduous work was just before, during and immediately after a major engagement. When Mr. Cogley arrived at McConnellsburg, among the mountains, there was much local excitement over rumors of a raid by the Confederates. The rumors were soon verified by the arrival of a detachment of Virginia troops.

The Major in command offered no violence, but rumors spread that a large force was coming, and as Cogley had received strict orders not to permit the enemy to capture him, he began plans to get out of town.

Three Southern soldiers stole some horses from a bar near town. A Union Lieutenant home on furlough pursued them and shot one through the neck. The poor fellow was carried into the hotel and placed on the bed in Cogley's room, where he died. A few days later more Southern soldiers came in, and affairs looked so threatening that Cogley started off.

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He threw his telegraph instruments over a fence into an orchard, so that they might not fall into the hands of the enemy. Colonel Pearson of the Twelfth Cavalry came to the rescue after Cogley had wandered on foot over a mountain, and the weary operator was put on a horse, where he slept while the animal went on for ten or fifteen miles, the Colonel and an adjutant holding him in the saddle.

General Harbord Announces New South American Radio Plans

THE adoption of an entirely new and extensive program for the promotion of radio broadcasting in Latin America by American interests following the abrogation of an agreement under which the American companies had jointly participated in South American radio business for the past three years with interests of England, France and Germany, was announced on July 24th by General J. G. Harbord, President of the Radio Corporation of America, who said the new plans gave the United States its first unrestricted opportunity to utilize fully its resources in developing radio in South America. Five of the principal countries of the continent, Argentine, Uruguay, Chile, Venezuela and Brazil will benefit by the new plan according to General Harbord.

The program not only includes a change in the system of distributing merchandise, which enables the American company to direct its radio activities with far greater efficiency than the previously existing arrangements had permitted, but it involves in addition the introduction of a practical method for support of broadcasting which will be first applied as a trial to the powerful broadcast station at Buenos Aires.

General Harbord explained that negotiations with other radio companies in South America had been in progress for several months, the outcome of which was the dissolution of the original local organization known as Radio Sud America. He pointed out that one radio company in England, France and Germany, together with the Radio Corporation of America had originally formed this organization as the sole distributing agency for the sale of radio apparatus of English, French, German and American manufacture but this arrangement did not prove sufficiently flexible to enable the participating members to conduct their individual business on a basis best suited to the technical and commercial development of the art and industry in South America.

"The cancellation of this former agreement marks the beginning of a new era in our South American radio activities," General Harbord said. "We are now in a position to carry the banner of the United States leadership in radio below the Equator. We have been somewhat retarded in the South American field due to the restrictions imposed by the four-sided compromise which has been in force since the end of the War."

"One of the outstanding advantages of the plan which was made effective following our release from Radio Sud America, is a system giving direct contact with the South America radio market from New York thus eliminating the expense incidental to carrying on operations through intermediate distributing centers. With newly organized outlets forming a part of the distribution circuits, terminating at Buenos Aires, Montivideo, Sao Paulo, Rio Janeiro, Valparaiso, and other leading cities, every new development in broadcasting apparatus will be made available to South Americans practically simultaneously with their introduction in the United States.

"There is every reason to believe that Latin America will continue to show an increasing interest in radio broadcasting. Particularly is this true now that a way has been devised to give her the advantages of apparatus embodying all the latest improvements contributed by engineers and scientists in the United States. Such cities as Rio de Janeiro, Buenos Aires, Montivideo, Sao Paulo and Valparaiso, and other centers of art and education scattered throughout the republics of Latin America are some of the great reservoirs which broadcasters may tap for a variety of program matter to be broadcast to millions of homes where the light of radio has not yet entered.

"Unlike North America, distances between cities are greater and a large percentage of the population resides in the vast farming regions. Radio broadcasting must break down these barriers of space which isolate town and village from the cities. Wire facilities, too, are not within as easy reach of the people of South America as they are in this country. Radio broadcasting will do much to supplement existing means of communication such as the telephone and the telegraph.

"It is a well-known fact that Latins now look to Americe to help in developing radio broadcasting in their respective countries. This knowledge is based upon the events of the past years, which have conclusively proved to the world that America now leads in radio communication in all its branches."

THE Ward Leonard Electric Company announces that they have appointed Ralph Morley, 5 Great Jones Street, New York, distributor in the metropolitan district for their complete line of motor starters and resistor units.

Mr. Morley has been in the electrical distributing business for some years.

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EDITORIAL COMMENT

The Historian of the U. S. Military Telegraph Corps Visits Gettysburg Battlefield

Tabard Inn, Chautauqua, N. Y.,
July 8, 1924

Mr. D. H. BATES, Allenhurst, N. J.
Dear Comrade:

So glad to get that interesting list of places you all took me to. It was a great treat, an education, a splendid memory.

Finally reached Gettysburg—Morning of July 4th, took auto to Seminary Hill where battle began—Dismissed guide there. Guides are alike everywhere. Observation in Europe and elsewhere taught me the necessity of self reliance. There were thousands of tourists in autos. They got scenery. I walked 10 hours, a mile an hour and got to the battlefield. They read almost no tablets—I read all, hundreds of them telling of the participant forces and losses as well as the locus of their fighting and often objective.

I climbed high Observation Towers and trudged on, a lone contented pedestrian. Saw no other—was in a class by myself. Finally I passed the Confederate right in the hollows, the woods and rivulets where our cavalry charged, sight unseen, catch as catch can and were badly worsted—Struck the Round Top which for ages will show stone breastworks—climbed the mountains and Observation Tower. There was more fighting here than on Lookout Mountain and more at stake. Viewed Devils Den, so many had asked me to locate. I told them before I had seen it that this was Hell once but it was Heaven now and there was no Devils Den. You see the herbage was lush—all the trees, shrubs, grasses and vines were smiling and the winds were making music on their harp strings—Climbed Big and Little Round Tops as stated and into the Tower—again took in the historical vista. Saw or seemed to see the several advancing hosts and how our cause trembled as the mighty armies clashed—the 300 guns echoed and re-echoed defiance—Saw Pickets 5000 move on, flanked by 10,000 more to the high water mark of the Rebellion—saw them melt away like mist before the sun—saw 9,000 muskets ownerless on the field and heard the dying groans of the Confederacy and of our defenders.

Then a great calm, broken here and there by victorious cheers of Union soldiers. Now a quieter repose, everlasting, marked by more monuments than were ever raised by Gratitude to Patriotism.—Untold in number, casting millions—History in marble and granite for the age.

Trudged on, passed the angle where in front were grape and cannister, stout hearts with muskets and even they sometimes used as clubs, swords and pistols, face to face in one desperate struggle—On the Confederate flanks were other Unionists and even far off were cannon sending their own messengers into this vortex of hell. On the Cemetery Hill which time and again had been charged but now resplendent in monuments and greenery.

Back to my room—In the morning I again went to Cemetery Hill where so often our men had to change front. Viewed the graves anew—the monuments more carefully and the spot where Lincoln's address started from, on its perennial round of the world.

That was, mildly put, my Gettysburg on foot, a pilgrimage longed for more than fifty years. Lame, no—tired yes. Most eighty and no heart. Declined several offers to ride. A sandwich, bottle of root beer, later one of ginger ale and three short rests—Another chapter in Life's History.

You say you may meet me next in my own home—I trust you all will. Nothing I have will be good enough for you, but it's all at your service with the smiles of your affectionate comrade.

WILLIAM R. PLUM.

Memorandum by D. H. Bates.

On the night of June 30, 1863, two military telegraph operators, Ten Eyck Fonda and Luther A. Rose, both long since dead, started by different routes from Frederick, Md., to deliver to General Meade, Secretary Stanton's dispatch telling of Longstreets whereabouts to join Lee's army. They both reached Meade about dawn July 1st, Fonda, first, and the news of Longstreet's movements enabled Meade to attack Lee at once, and win the battle, which otherwise he might have lost.

The news of Meade's great victory was sent by Sam Edwards and Ed. Hall over the single wire via Hanover Junction. It was received in the War Department about the same time as Grant's message announcing the surrender of Pemberton's Army at Vicksburg.

Senator Marconi's New Appointment

A ROME despatch announces that Senator Marconi has accepted the position of President of the Italian Radio Corporation, replacing Count Sanmartino who has resigned. It is understood that the position has been accepted on the Government's invitation who are anxious to secure the cooperation of the famous inventor with regard to the installation of a super-power station in Italy which will be capable of communicating direct with Argentina and also the remodelling and modernizing of the Coltano station so that the latter can maintain continuous communication with North and South America.

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Hawkin's Electrical Guide contains ten wonderfully helpful and practical volumes, written in clear, concise language, easy to understand, no wasted words, full up-to-the-minute electrical knowledge, which can be applied to problems that come up from day to day. You can carry a number of the books with you until you have mastered the subjects. All subjects are indexed so that you can find the information instantly. Written in the modern question and answer form. It's like having an electrical authority always at your elbow ready to answer any question you ask. 4700 pictures, 3500 pages, pocket size, flexible cover; price $10.00 for the full set of ten books. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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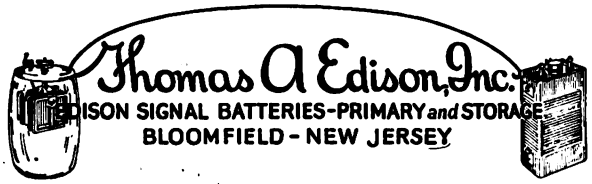
Another big advantage appreciated by Edison Primary Battery users is the economy in intermittent service for the reason that no deteriorating internal action takes place when the circuit is open.



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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

W. A. FAIRBANKS, secretary, is working on the committee reports to submit for ratification at the annual meeting of the section to be held in the Hotel Frontenac, Quebec, Que., September 9th, 10th and 11th.

There have been no committee meetings during the past two weeks.

Coming Conventions

OLD Time Telegraphers' and Historical Association, Hotel Roosevelt, New Orleans, La., October 30th, 31st and November 1st.

Telephone Pioneers of America, Chicago, October 10th and 11th.

Telegraph and Telephone Section of the American Railway Association, Hotel Frontenac, Quebec, Que., September 9th, 10th and 11th.

The Short-Circuit Court

A MAN was arrested for assault and battery and brought before the magistrate.

Magistrate (to prisoner): What is your name, your occupation, and what are you charged with?

Prisoner: My name is Sparks, I am an electrician, and I am charged with battery.

Magistrate: Officer, put this guy in a dry cell.—Electricity.

Radio Corporation of America

MAJOR GENERAL J. G. HARBORD, President, was a prominent figure and principal speaker on the program at the sixth annual reunion of the Forty-second Rainbow Division at Columbia, S. C., the week of July 14th. He denounced "pacificism" in a stirring address.

David Sarnoff, Radio Executive, Sails to Gather Facts on European Radio Progress

"The great strides now being made in the development of broadcasting in some of the European countries following the impetus given to the art in the United States, and the problems effecting international communications which a constantly developing art may forecast, require a world outlook if the complete picture is to be envisaged." said David Sarnoff, Vice President and General Manager, before sailing on June 12th, on the steamship Homeric, for a tour of European radio centers.

"Radio," he asserted, "is becoming increasingly a world problem. When a concert broadcast in Pittsburgh is received in the Argentine and rebroadcast by the local stations there to thousands of listeners in that republic, the day when we in America may have a regular service of international broadcasting comes nearer to realization. Equally important developments may be forecast in the field of transoceanic commercial communication."

He will return after a visit of five or six weeks, during which he will visit London, Paris, Berlin, and other centers of European radio activity.

EVERY USER IS A KLEINSCHMIDT BOOSTER

ONE CUSTOMER WRITES:

We are having little or no trouble with our machines. One man is taking care of twenty Telegraph Typewriters and he devotes part of his time to other matters.

ANOTHER WRITES:

We wish to advise you that your Telegraph Typewriters are working fine and doing everything you guaranteed them to do. We find the system one for efficiency and an asset to our working organization.

A THIRD WRITES:

Both machines gave excellent service and had hard usage as the test work is sometimes rougher than regular work on good lines.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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A Digest of Changes Between the 1921 and 1924 Tax Laws

By H. Archibald Harris.

(*Continued from page 326, July 16th Issue.*)

Credits Allowed for Normal Tax Purposes

Dividends paid by a corporation organized under the China Trade Act are not allowed as credit for normal tax purposes as are other dividends.—Section 216 (a).

Married person or head of family—$2,500.

Personal exemption allowed United States citizens or residents—$1,000 or $2,500—shall, if status of taxpayer changes during year, be changed also. If he was single four months and married eight months, he has one-third of $1,000 plus two-thirds of $2,500. The month in which the change occurred shall be counted according to which status occupied the greatest portion of the month.—Section 216 (f) (2).

Deductions

Contributions by individuals to fraternal-societies, etc., operating under a lodge system or to a trust shall be allowed as deductions if the contributions are used for religious, scientific, educational or other named purposes.

Deductions shall not ordinarily exceed 15% of the net income but if in the taxable year and in each of the ten preceding years the amount of contributions combined exceeds 90% of the taxpayer's net income for each year, then the full amount of such contributions shall be allowed.—Section 214 (a) (10).

Earned Income

Earned income is any compensation for services actually rendered—does not include amounts received by a stockholder of a corporation which represents distribution of profits rather than compensation for services.

Where a taxpayer is engaged in a trade or business and both personal services and capital are material income-producing factors a reasonable allowance as compensation for the services of the taxpayer shall be considered earned income, such "earned income," however, not to exceed 20% of his share of the net profits of the trade or business. —Section 209 (a) (1).

"Earned income deductions" means and deductions under Section 214 properly allocable to earned income.—Section 209 (a) (2).

"Earned net income" excess of earned income over earned income deductions.

If taxpayer's net income from all sources is not more than $5,000 it shall be considered earned net income.

If the net income is more than $5,000 at least $5,000 of it shall be treated as earned net income.

Earned net income shall never be more than $10,000.—Section 209 (a) (3-.

An individual shall receive as a credit against his normal tax 25% of the amount of the tax computed on his earned income at regular rates. Such credit shall in no case be more than 25% of his normal tax.—Section 209 (b).

The method of handling partnership earned income is put to the Commissioner who is authorized to draft regulations.—Section 209 (c).

Fiscal Years of Partnership

Partnership has a fiscal year. If the law in first part of fiscal year is different from the law in the second part, the partnership shall compute its income under the laws applicable to both. The partners shall report that proportion of the income computed in each year which corresponds to the number of months in each calendar year falling within such fiscal year.

Partnership income taxable at rates for the seccond year shall be added to the other income for the second year and the total placed in the lower brackets for such year. The part of such income subject to the rates for the preceding calendar year shall be placed in the next higher brackets of the rate schedule applicable to that year. (This shall be included in the taxpayer's income return for the calendar year during which the fiscal year of the partnership ends.)—Section 207 (b).

Gain or Loss

If in a reorganization money or other property is received together with the stock of a corporation, a party to the reorganization so that gain or loss may result (Section 203 (d) (1), any part of the gain covered by earnings or profits accumulated since 2/28/13 shall be taxed at surtax rates only; any gain not covered by such earning or profits shall be subject to both normal and surtax.—Section 203 (d) (2).

Income—Gross

A person having tax-free securities must submit with his return a statement showing the number and amount of such obligations and the interest received.—Section 213 (b) (4).

Provision is made for refund to states or municipalities of tax paid by public utilities on income accruing to the state or municipality.—Section 213 (b) (7).

Payments under the World War Veterans Act, 1924, are exempt—also State Pensions. (This last provision does not appear to be necessarily a war pension.)—Section 213 (b) (9).

In order that an exemption of $300 income per year be allowable the domestic building and loan association shall be one "substantially all of the business of which is confined to making loans to members" instead of one which is operated exclusively for such purposes as under 1921 Act.—Section 213 (b) (10).

If a citizen of China, residing therein, receives dividends from a corporation organized under the China Trade Act, 1922, the stock of the corporation being in good faith vested in him, such dividends are exempt from surtax.—Section 213 (b) (13).

Net Losses

If a taxpayer other than a corporation has in the second year a capital net gain, the net loss of the

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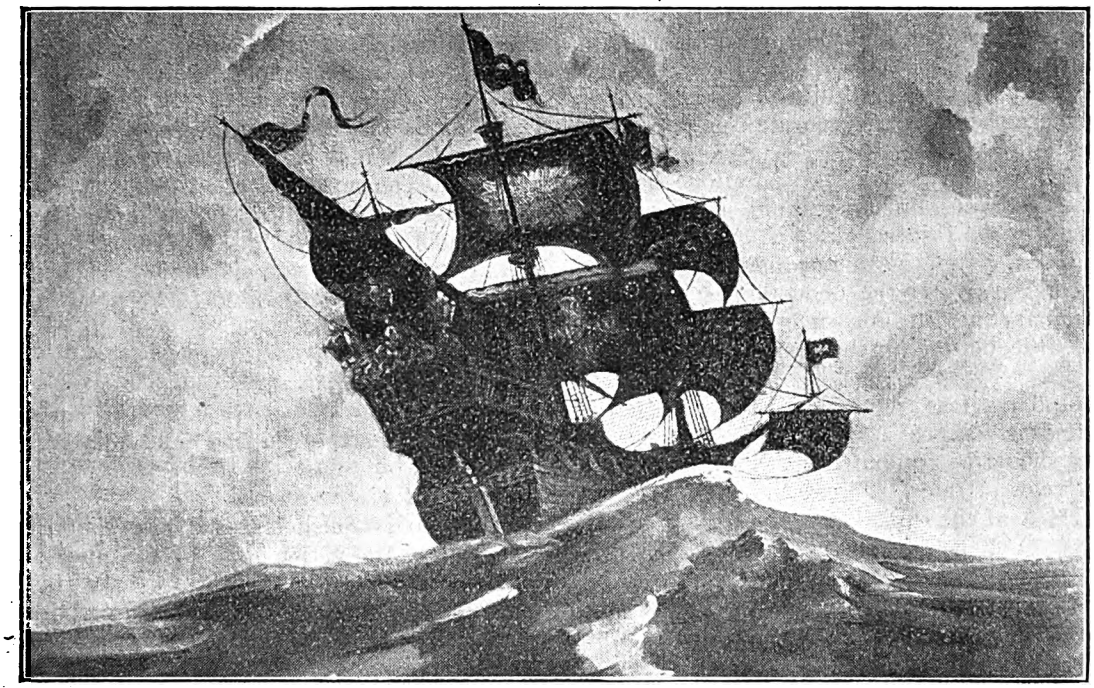

The Spirit of Pioneering

Impatience with present facilities, a restless searching for perfect things—these have driven men to discovery and invention. They possessed the early voyagers who turned their backs on the security of home to test opportunity in an unknown land. They explain the march westward that resulted in this settled, united country. And they have inspired the activities of the Bell System since the invention of the telephone.

The history of the Bell System records impatience with anything less than the best known way of doing a job. It records a steady and continuous search to find an even better way. In every department of telephone activity improvement has been the goal—new methods of construction and operation, refinements in equipment, discoveries in science that might aid in advancing the telephone art. Always the road has been kept open for an unhampered and economic development of the telephone.

Increased capacity for service has been the result. Instead of rudimentary telephones connecting two rooms in 1876, to-day finds 15,000,000 telephones serving a whole people. Instead of speech through a partition, there is speech across a continent. Instead of a few subscribers who regarded the telephone as an uncertain toy, a nation recognizes it as a vital force in the business of living.

Thus has the Bell System set its own high standards of service. By to-day's striving it is still seeking to make possible the greater service of to-morrow.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

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prior year shall first be used as a deduction in computing income for such "second year." If such net loss exceeds the ordinary net income such excess shall be applied against the capital net gain for such year and any excess loss shall be carried over to the "third year."—Section 206 (c) (2).

A captial net gain in the "third year" is handled by a taxpayer other than a corporation in the same manner as in the "second year."

If a taxpayer (other than a corporation) has, in the second year sustained a capital net loss, the deduction for a net loss sustained in the prior year shall be used in computing the ordinary net income ot the second year. If the deduction is in excess of the ordinary net income such excess shall be allowed as a deduction for the third year.—Section 206 (c) (1).

If a capital net loss is sustained, the taxes shall be computed as follows:

The tax should be computed on the ordinary net income at regular rates. From this shall be subtracted 12½% of the capital net loss.—Section 208 (c).

Rates of Tax—Normal Tax

Rates for American citizens:	*1921 Act*
2% on first $4,000 above exemptions and credits	4%
4% on next $4,000	8%
6% on rest of income	8%
Rate for non-resident aliens:	
6% on all taxable net income in excess of $1,000	8%

Rates for non-resident aliens residing in Canada or Mexico:

2% on (salaries, wages, etc.) first $4,000 in excess of $1,000 plus any credits for dependents.

4% on next $4,000 salaries, wages, etc. (not all kinds of income).

6% on all salaries and wages in excess of $8,000, above $1,000, plus credit for dependents.

6% on all other income in excess of personal exemptions ($1,000 plus credits for dependents).—Section 210.

Surtax

Surtax begins at $10,000 net income. 1921 began at $6,000.

From $10,000 to $14,000 rate is 1%.

1% is added for each $2,000 until $500,000 is reached.

All net income over $500,000 is subject to 40%.—Section 211 (a).

Returns

Married persons living with husband or wife must file a return if the net income is $2,500. (1921 law $2,000.)—Section 223 (a) (2).

Joint return provision same as 1921 Act except net income raised from $2,000 to $2,500.—Section 223 (b).

Returns for period less than twelve months:

Commissioner is empowered to make regulations prescribing method of computing tax on such returns where during the fractional part of a year covered by a return the taxpayer has had a capital net gain, sustained a capital net loss or has received earned income.

In cases of fractional returns not due to changes of accounting period the personal exemptions and credits for dependents are prorated.—Section 226 (e).

Tax Paid at Source (Withholding)

Rate of withholding on salaries, wages and other fixed and determinable annual gains of a *non-resident alien*—6% instead of 8% as under 1921 Act.

Withholding returns due March 15th.—Section 221.

CORPORATIONS

Capital Gains or Losses

Corporations allowed all capital losses.

China Trade Act

Entirely new. Special credits for corporations organized under the China Trade Act, 1922.—Sec. 263.

Consolidated Corporations

Affiliation established if one corporation owns at least 95% of the voting stock of the other or others or if at least 95% of the voting stock (instead of "substantially all") of two or more corporations is owned (instead of owned or controlled) by the same interest.—Section 240 (c).

The Commissioner shall if necessary in order to correctly establish income of two or more related trades or business owned or controlled by the same interests consolidate the accounts of such trades or business, such consolidation to be made at the request of the taxpayer as well as at the demand of the Commissioner, which was the only way in the 1921 Act.—Section 240 (d).

Deductions

Dividends not allowed as a deduction include those paid by a corporation organized under the China Trade Act of 1922.—Section 234 (a) (6).

Evasion of Surtaxes

When a corporation holds earnings to prevent payment of surtaxes by its shareholders an additional tax of 50% of the corporation's net income shall be added instead of 25% as in 1921.—Section 220.

Net income means taxable net income plus any dividends received and plus any interest on obligations of the United States which would be taxable in the hands of an individual instead of taxable net income as in 1921.

1924 Act does not allow the shareholders to elect to be taxed as members of a partnership as under 1921 Act.

The fact that a corporation is a mere investment company is prima facie evidence of a purpose to escape taxation.

Exempt Corporations

A local association of employees, the membership of which is limited to the employees of a designated person in a particular municipality and the net earnings of which are devoted exclusively to charitable, educational or recreational purposes is ex-

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mpt.—Section 231 (8).

Benevolent life insurance associations of a purely ocal character and mutual casualty insurance companies are exempt. Most corporations are not required to be of "purely local character" as was the ase under the 1921 Act. To be exempt such corporations must derive 85% of their income from mounts collected from members for the sole purose of meeting expenses, instead of deriving their ole income from such sources as under 1921 Act.—ection 231 (10).

ain or Loss—Basis for Determining

If property (other than stock or securities of a ompany a party to a reorganization) was acquired fter 12/31/17 by a corporation in connection with reorganization and immediately after the transfer n interest of 80% or more in such property remained in the same persons or any of them, the asis shall be the same as if the transferor had sold he property adjusted by any gain or loss recognized at the time of the transfer.—Sec. 204 (a) (7)

In case of sale of property (other than stock or ecurities of a corporation a party to a reorganization), acquired after 12/31/23 by a corporation by he issuance of its stock where after the transfer he control of the corporation was in the persons who ransferred the property to it, the basis is same as f transferor had sold the property, adjustment being made for any gain or loss recognized when ransfer was made.—Section 204 (a- (8).

(To be Continued)

American Telephone and Telegraph Company

To THE STOCKHOLDERS:

Your Company on May 20th offered additional shares of its capital stock for subscription, at par, to its stockholders of record at the close of business on Tuesday, June 10th, in the ratio of one share of additional stock for each five shares of stock then held. This offering, which amounted to $151,157,500, was made to 316,000 stockholders. Funds from this issue will provide for extensions to the nation-wide telephone system.

The constant growth of the telephone business provides a continuing opportunity for investment of capital in extending the facilities of the System. It is the well-established policy of the Bell System to secure its capital requirements as economically as possible and to keep its financial structure on a sound basis. To this end a portion of the new capital is obtained from net earnings retained in the business, a portion is borrowed by means of bonds and notes, and the remainder is secured through investment by its stockholders in capital stock.

By earning, with a margin, and paying a dividend which keeps the stock attractive to investors, the System's securities receive a high rating and it is able to obtain its borrowed capital on the lowest possible terms. The net result is that total capital charges are kept as low as practical in view of the best interests not only of the Company but also the telephone-using public.

The financial policy of your Company includes securing nation-wide distribution of its securities. It is estimated that there are now well over half a million persons who own Bell Telephone securities.

Below is a statement of the earnings of your Company for the first six months of this year, as compared with the first six months of last year.

H. B. THAYER, *President.*

American Telephone and Telegraph Company Earnings Report

Earnings:

	6 Months Ending June 30, 1923	6 Months Ending * June 30, 1924
Dividends	$25,712,497.50	$29,390,650.71
Interest	6,396,462.43	7,101,689.60
Telephone Operating Revenues	35,867,724.11	36,800,723.43
Miscellaneous Revenues	192,693.67	235,431.58
Total	$68,169,377.90	$73,528,504.32
Expenses Including Taxes	21,122,295.91	22,576,746.07
Net Earnings	$47,047,081.99	$50,951,758.25
Deduct Interest	6,467,664.49	8,361,576.75
Balance	$40,579,417.50	$42,590,181.50
Deduct Dividends	30,349,963.16	33,670,638.42
Balance	$10,229,454.34	$8,919,543.08

*Subject to minor charges when final figures for June are available.

Theory and Practice of Public Utility Valuation

THE Theory and Practice of Public Utility Valuation by W. H. Maltbie is a book produced by the McGraw-Hill Book Company, Inc., of New York. This book is intended to be a discussion of the principal points in the theory and practice of public utility valuation, presented in such a way as to make it intelligible to the general public. It is not a reference work for the valuation specialist, and, therefore, in general, makes no attempt to support its statements by reference to recorded decisions.

The subject is a complex one, including many points on which students of the subject will disagree, at least until the Supreme Court of the United States has ruled definitely upon them. Until that time the conclusions of any writer must stand or fall by the strength of the arguments on which they rest.

This book represents the conclusions of an individual student of the subject, given to the public in the hope that it may assist his fellow students who are seeking to develop a sound and logical method of dealing with a difficult problem. The price of the book is $2.00 and copies may be obtained by addressing J. B. Taltavall, Publisher, Telegraph and Telephone Age, 253 Broadway, New York.

Lightning Flashes and Electric Dashes

A BOOK made up of bright, ably written stories and sketches, telegraphic and electrical, that should find a place in the home of every telegrapher; 100 large, double-column pages; profusely illustrated; $1.00.

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POSTAL TELEGRAPH-CABLE CO.

THE Main Office was well represented at the record breaking Democratic Convention held recently at Madison Square Garden, New York City. At the large temporary quarters of the company, A. P. Kranshaar, M. Feeley, and E. McCormick were among others from 253 Broadway, who assisted in disposing of the immense file of press, and in directing the picked force of newspaper operators. The Main Office had a half a dozen pony wires direct to the Garden in addition to the through wires. C. W. Oram, at the dispatchers board, loop chiefs C. Almes, W. Redlefson, and J. Ulla, together with the general all around good work of the whole force rounded out a machine which handled this extraordinary file with skill and dispatch.

A. Jachens, operator in the City Division, who was absent almost a year on account of illness has returned looking fine.

Frank Ferrante, of the General Traffic desk, has returned to an early night tour, and is succeeded by C. W. Oram, who, in turn, was relieved by N. Spinosa, on the Pacifics.

James Russo, Quadruplex Chief, is to be congratulated on the arrival of another baby girl. Jim, who is an ardent poker fan, claims that it will be difficult to beat him now with his three queens.

ATTORNEY PATRICK J. FARRELL was at one time known as Chief Operator Farrell of the Postal Telegraph Cable Company, Boston, Mass. While serving as chief operator, Farrell studied law nights. When he received his coveted sheepskin and was admitted to the bar, "Pat" reversed the order of things and practiced law days while he operated nights to help him get a good footing on the legal ladder.

A. ALAGOOD of Baton Rouge, La., has been appointed manager of the office at Waco, Texas.

Radio Phone Receiving

Radio Phone Receiving is the title of a book that was placed on the market on May 1. It is a practical work for everybody and was written by nine specialists. It contains 224 pages, fully illustrated. The book measures 7½ inches long by 5 inches wide. The price is $1.50 per copy.

The authors include Michael I. Pupin, Alfred N. Goldsmith, Erich Hausmann, Frank E. Canavaciol, John H. Morecroft, Robert D. Gibson, Louis A. Hazeltine and John V. L. Hogan.

The very questions frequently asked by the radio operator are answered in this book. Explanations and solutions of the difficulties encountered by the radio enthusiast are treated in a clear and comprehensive manner. The book fills a long-felt want. It is just what you have wished for! It will teach you how to receive messages of any wave-length to perfection. It will help you to solve your troubles and save you money in the proper selection of the apparatus required. The last word in telephone receiving, beautiful photos and simple diagrams accompany the text. Regardless of what other books on radio you own—this is the book you must have. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

THE WESTERN UNION TELEGRAPH CO.

Earnings Report—For Six Months Ended June 30th, 1923 and 1924

(Month of June, 1924, estimated)

	1924	1923.
Gross Revenues, including Dividends and Interest.	$55,218,618.00	$56,135,450.00
Maintenance: Repairs and Reserved for Depreciation	$9,396,487.00	$ 8,958,687.00
Other Operating Expenses, including Rent for Leased Lines and Taxes	38,584,568.00	39,093,304.00
Total Expenses	$47,981,055.00	$48,051,991.00
Balance.....	$ 7,237,563.00	$ 8,083,459.00
Deduct Interest on Bonded Debt.....	1,156,050.00	1,153,425.00
Net Income	$ 6,081,513.00	$ 6,930,034.00

A. SIMON has been appointed assistant to Commercial General Superintendent J. F. Nathan, Metropolitan Division, New York.

J. R. LUFF has been appointed chief operator at West Palm Beach, Fla.

J. H. Cormick has been appointed chief operator at St. Petersburg, Fla. ,

B. P. Key, chief operator at Savannah, Ga. and W. M. Epstein have been made acting chief operators at W K Cotton Exchange, New York.

E. R. Shute, operating engineer, is absent on his vacation, and will return to his office early in August.

Democratic Convention

NOT until 1924 has New York City been the scene of a great political convention since the Democratic convention of 1868 when the nominee was selected on the twenty-second ballot. The convention of this year which closed its deliberations in the early morning of July 10th, required 103 ballots to reach a two-third choice thus setting a mark for balloting never before approached and which has undoubtedly created a record which will endure for all time. The greatest number of ballots cast at any previous convention were 57 in the memorable contest at Baltimore in 1860.

The Democratic Convention held in Madison Square Garden and just ended was, telegraphically speaking, the biggest thing of its kind as an individual event with which the Western Union Telegraph Company has ever had to cope. The success attending the efficiency of the telegraph service need not be featured in its separate departments but may be summed up briefly by characterizing it as nothing short of phenomenal. Just why the service was so phenomenal in character may be gleaned from the fact that more than 10,000,000 words of press were handled by the Western Union Telegraph Company, with practically all of this enormous amount being given direct and instantaneous transmission from Madison Square Garden to its destination.

In the elaborateness and completeness of its preparations for handling Convention news, the West-

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n Union with its usual foresight, installed in adison Square Garden what was essentially a mplete telegraph office capable of caring for any lume of press or other ramifications of its ser-ce and were prepared to indefinitely carry on. siness 24-hours a day. As it happened this ser-ce was temporarily required for 18 days. June th to July 10th inclusive.

The Morse outlay at the Garden consisted of 113 erating positions with attendant switchboards and her necessary apparatus which was augmented two double channel multiplex circuits. One of e latter terminating at Chicago and the other rminating at Spokane, Wash. The purpose of the hicago multiplex was to handle middle-west traffic, hile the second circuit was known as the "multi-ex way circuit" deriving its name from the fact at seven points, Chicago, Denver, Los Angeles, an Francisco, Portland, Seattle and Spokane, were uipped with "floating channels." These floating annels it may be explained, are "stepped in" with ither of the main terminals making automatic eration possible between practically any two large ties, or small ones so equipped, in the country. n average of 70,000 words of press were handled ily over this particular circuit at the New York nvention and a corresponding average obtained at e Cleveland convention where a similar circuit as in operation.

The magnitude and extent of the preparatory ork done by Western Union officials and lesser mployees as well as the carrying to a successful nclusion the well laid plans, does not admit of ny particular personal praise. The result was the ighest type of organization coordination in which very employee from messenger to president con-ributed his share with unselfish eagerness.

In addition to Vice President J. J. Welch, Divi-ion Traffic Superintendents, I. D. Hough and C. . Fisher the local personnel was comprised of the ollowing from the Metropolitan and Lake Divi-ions:

F. S. O'Connor, in General Charge; J. L. Fin-eran, Chief Dispatcher; Division Traffic Super-isor C. W. Samuels of Superintendent Edward's taff; J. W. McMahon of the New York Testing nd Regulating Department; R. H. Tucker, Day Wire Chief; F. J. Reilly, Night Wire Chief.

M. D. Coombs, Division Traffic Supervisor, Lake Division; E. W. Springer, Division Traffic Super-isor, Lake Division.

F. W. Pugh, T. D. Walker, J. H. Lillie, F. E. Smith, H. J. Hefter and H. W. Benas, of the Chi-ago Main office; J. P. Lathrop and F. Davis, of the New York organization served as editors.

Supervisors—B. F. Griffiths, D. B. White, W. C. Brower, H. Reipstein, J. N. Kelly, D. L. Edwards, H. Gutman, of New York; A. W. Walters, H. A. Mead, J. Belassa, C. A. Fuller, G. Cates, of Chi-ago.

The Automatic Testing and Regulating was handled by E. H. Martin of Chicago, and O. A. Benson and H. A. Ashmore, of the New York Main Office.

During the closing hours of the convention an unanimous resolution was passed conveying to the telegraph, telephone and broadcasting companies, its sincere thanks for the highly efficient manner in which the respective methods of news dissemination were conducted and for the impartiality and accuracy of their reports.

OBITUARY

OLD-TIME telegraphers learn with deep regret of the death of Lawrence J. Malone, supervisor of telegraphs of the New England Telephone and Telegraph Company. He had been ill for two months with heart trouble. Funeral services were held on July 15th, at St. Thomas' church, Jamaica Plain, Boston. The body was laid at rest in St. Joseph's cemetery, West Roxbury.

Mr. Malone was fifty years of age, a native of Ireland, coming to the United States when a boy. He started his career as a messenger boy with the Western Union Telegraph Company. Advancing to the position of telegraph operator he was made manager of the White River Junction, Vt., office. After several years in this office he returned to Boston and affiliated himself with the telegraph department of the New England Telephone and Telegraph Company. For more than twenty years he served with this company.

He presided over the A. O. H. Division 15 for three years as president. He also served as president of the Telegraphers' Mutual Aid Association, an organization composed of local telegraphers.

In addition to his widow and five children he is survived by two brothers, Edward and Dr. Charles Malone, all of Jamaica Plain.

THEODORE F. TAYLOR, who was on the pension list of the Postal Telegraph-Cable Company, New York, died in California on May 27th. Mr. Taylor was a well known telegrapher in the East, having occupied positions of trust in several of the smaller companies. He was born in Delaware City, Del., on August 27th, 1847, and is survived by a wife and six children. He had been in California for over a year past.

Prime's Life of S. F. B. Morse

THIS work was authorized by the family and executors of the great inventor, compiled from original data. It includes the history of the invention of the telegraph and the many important business connections with those who were interested with Prof. Morse in the development of the telegraph; sheepskin; 775 pages; illustrated; $3.00.

Remit to and address Telegraph and Telephone Age, 253 Broadway, New York.

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The Late Joseph W. Kates

JOSEPH W. KATES, born at Wilmington, Del., September 6, 1840, died in Richmond, Va., on January 1, 1908. Mr. Kates was a well known figure in telegraph circles below the Mason-Dixon Line.

He served with the Postal Telegraph-Cable Company since its advent in the South, having constructed the lines from Washington southward to New Orleans, Mobile, Savannah, Charleston, Norfolk and many other points in the Southern States. He equipped the offices and organized the operating force, and managed the business and offices of the company in the southern territory.

The retirement of Mr. Kates from active service in the telegraph world called to my mind that he has been a telegraph man in Virginia longer than any other person now living, and yet he was not a very old man. It may be said that the history of his life is the history of the telegraph in the south.

Mr. Kates began his work, like all great telegraphers; commenced pounding the "key" in Petersburg in 1858, having just graduated as a boy from a telegraph office in Wilmington, Delaware. At that time telegraphy was in its infancy. The line then in operation was the Washington and New Orleans Telegraph Company. This was before the sounder instrument was adopted, and all messages were received upon a recording paper register. It was not then believed that telegraph messages in volume could be received by sound as at the present day. A rule of the telegraph company required all of its operators to receive by paper, although even at that early day there were many expert operators who read by sound, among these was Mr. Kates. He was transferred to Richmond in 1850 in the service of the same company.

The telegraph facilities of this city at that time, and in fact of all the south Atlantic States, consisted of but two wires. One of these was for through business, a considerable portion of which was transferred between New York, Mobile and New Orleans. The other wire was used for local and way business. The railroads then did little or no telegraphing. They had no lines of their own, no train dispatchers as now, and relied altogether upon their time tables.

To show the immense growth of the telegraph since that time, the entire business, both operating and clerical, of the only office in this city was done by two men—George Rady, being the manager and Mr. Kates his assistant. This force was not increased until the latter part of 1860; and during the intervening period Messrs. Rady and Kates handled all the extra business occasioned by the John Brown Raid and its consequent excitement in Virginia, and indeed, the entire country. About the close of the same year, Mr. Kates was ordered to Alexandria, where he remained in charge of the Washington and New Orleans telegraph office until the occupation of that city by the Federal forces in May, 1861.

He then went to Manassas Junction, where he was in charge of the telegraph service at the time of the battles of Blackburn's Ford and Manassas and for several weeks did all the work of the office himself. While there Mr. Kates transmitted the famous message of President Jefferson Davis to General Joseph E. Johnston at Winchester, ordering that officer to make a junction with General Beauregard at Manassas. The message was sent with great difficulty over a line from Manassas to Strausburg, which had been completed only a few days.

Mr. Kates fought General Thomas T. Eckert, the head of the American Union Telegraph Company at every place in every possible way as to the right of way on railroads and in cities so much so that when the American Union Telegraph Company and the Western Union Telegraph Company were consolidated General Eckert relieved J. W. Kates and placed Robert Morton in charge at Richmond. Then James Merrihew made Mr. Kates superintendent of Philadelphia Locals. Merrihew and Kates were messenger boys in Wilmington, Del.

Couldn't Fool Her

ALEX LEWIS was soliciting a customer of his in an insurance office when a woman wearing an anxious expression called.

"I understand," she said, "that for five dollars I can insure my house for a thousand dollars."

"Yes," replied the agent, "that is right."

"And," continued the woman anxiously, "do you make inquiries as to origin of the fire?

"Certainly" was the prompt reply.

"Oh," and turned to leave the office "I thought there was a catch in it somewhere."

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CONTENTS

PAGE

The Freedom of the Air—Uncensored and Uncontrolled. By David Sarnoff. Facts About Electricity. . . . 364

A Messenger Boy's Experience. By Robert Ellis, New York. Telephone Development in the Argentine Republic. . . . 365

A Frontier Wedding by Telegraph. By Chas. M. Clark. . . . 366

Two Old Telegrams. . . . 367

New Westinghouse Short-Wave Experimental Station. . . . 368

Senator Marconi and the Wireless Beam. . . . 369

A Digest of Changes Between the 1921 and 1924 Tax Laws. By H. Archibald Harris. Concluded, from page 359, August 1st Issue.) . . . 370

Radio-Filter Condensers. By D. G. Little. Formation of a Dutch Subsidiary. Eleventh Annual Meeting of the Telephone Pioneers of America. . . . 372

The Care and Handling of Quadruplex Apparatus—Adjusting for Greater Efficiency. . . . 373

Telegraph Company's Flight. A. I. E. E. Appointments. . . . 374

Recalls Burns Fete Held Sixty-Five Years Ago. Direct Cables Between Italy and South America. . . . 375

Editorial Comment—David Homer Bates. A Newspaper Equipped with Wireless. Rail Telegraphers Get More Pay. Coming Conventions. . . . 376

The Railroad-Telegraph and Telephone Section of the American Railway Association. . . . 379

Radio Corporation of America. . . . 381

Personal. Postal Telegraph-Cable Company. Commercial Cable Company. Western Union Telegraph Company. . . . 382

Canadian National Telegraphs. All-America Cables. Obituary. . . . 383

Telegraph and Telephone Life Insurance Association. . . . 384

The Business Well Maintained. . . . 385

Swedish Railways Changing Motive Power. . . . 386

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The Freedom of the Air—Uncensored and Uncontrolled

By David Sarnoff

With over five hundred stations, large and small, broadcasting daily programs of music, entertainment and speech to a radio audience of probably 10,000,000 people in the United States, it is strange that the cry of monopoly should reverberate through the press in any discussion of the broadcasting problem. For there are no getaways in the air to bar the human voice. Mechanically and scientifically no power exists that can permanently block the airways of space. No development in the air, actual or projected, would justify the thought that the vast reaches of air could be confined to the range and power of any one system of broadcasting stations. The danger to free speech in the air comes from another source.

There are two fundamental schools of thought today with regard to the solution of the problem of radio broadcasting, neither of which infringes upon the freedom of the air. It is declared, on the one hand, that the solution of the problem calls for some of payment on the part of the millions of receivers of radio programs. Broadcasting, they say, must be made to pay its own way in order to stabilize the radio industry. And it is true that the equipment and maintenance of a modern broadcasting station require an ever-increasing investment of capital and effort.

The other school of thought bases its approach to the problem on a different thesis. It is that radio has developed an industry, the success and growth of which are dependent upon an extraordinary service to the public. Without broadcasting, every receiving set in the country would be but a useless piece of mechanism. It is the duty of the industry, therefore, to supply at least the equipment and organization for such a service, and to provide an untrammeled forum in the air.

As the art progresses I believe that radio more and more will become the universal voice. It is the first method of communication discovered by man whereby millions of people can instantaneously and simultaneously be reached with the same thought, the same appeal, the same emotional impetus. Radio gives the human voice a limitless range. Its destiny is to bring light, education, and entertainment even to the remotest home in the country, by a method that no other system of communication has ever been able to equal.

The broadcasting station of the future, in my opinion, will be the bar at which great causes will be pleaded for the verdict of public opinion. It is vitally important, therefore, that the expressions of educators and statesmen should reach the vast radio audience uncensored and uncontrolled. So powerful an instrument of public good should and must be kept free from partisan manipulation. The same principles that apply to the freedom of the press should be made to apply to the freedom of the air. Public interest should be the sole test of admission to this illimitable forum. No political, racial, or color line should ever be drawn.

To tax the public for radio reception would be a reversion, in my belief, to the days of toll roads and bridges, to the days when schools were not free and libraries were not public.

The danger to freedom of speech by radio is not the danger that any one interest will ever be able to monopolize the air. The real danger is in censorship, in over-regulation. If the radio industry is to give to the public the greatest possible service, it must be encouraged, not harassed by government regulation; if the air is to be kept free for the public good, public opinion must determine the fitness or unfitness of those who seek to appear at its bar.

—*The Nation.*

Facts About Electricity

Tangent Galvanometer.—The intensity of the current, as measured by the tangent galvanometer, is proportioned to the tangent of angle of deflection of the needle.

Bradley's Improved Tangent Galvanometer is the only one in use in the United States for line work, and is undoubtedly the most accurate tangent instrument made. We quote the description from Dr. Bradley's pamphlet. The needle is a peculiar one, being composed of three or more parallel strips of steel, mounted upon a ring of aluminum, and trimmed to form a circle. Long aluminum pointers are attached to this disk. The needle is balanced upon a steel point, on which rests an agate. The weight of the needle is only twenty grains.

The coils are so placed that the current runs parallel with the meridian of the needle. They are half a inch or more wider than the diameter of the disk. By this means all parts of the steel composing the needle are subjected to the same inductive influence in all its deflections.

It is a condition indispensable in the construction of a true tangent galvanometer, that the current through the coil should act as uniformly upon the needle in all its deflections as the earth's magnetism does; a narrow coil under a long needle does not fulfill this condition; for, as the extremities of the needle in its deflections pass more and more away from the coil, the inductive influence is less and less, as compared with the earth's influence.

On the contrary, if we place a very broad coil under a long needle, the same difficulty occurs, but in the opposite direction. While the needle is on the meridian it is under the influence of but few convolutions in the middle of the coil, but as it deflects it comes under the influence of an increasing number of convolutions, and therefore the influence is more and more increased.

It being evident that the truth lay between these extremes, the expedient of a needle in the form above described was resorted to, and with entire success, for in this the condition sought is accurately fulfilled.—*Haskin's Galvanometer.*

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A Messenger Boy's Experience

By Robert Ellis, New York

"Messenger boys are called upon to do most anything, from carrying the weekly wash to the laundry or taking the baby out for an airing—but having to tote a dog at the end of a rope around to different saloons to look for his master, is, I believe, an unique experience even for a messenger boy.

Where I was employed in Brooklyn, N. Y., as a messenger boy, a woman approached the manager and requested that he send a large boy to her home to fetch a dog she had there, to locate her husband. I was very small, but the only boy available, so she was compelled to hire me. She explained to the manager that she was in ignorance as to her husband's whereabouts, but gave me a slip of paper which contained a list of several well known saloons in the downtown section of Brooklyn.

With a trembling heart and a perturbed mind, I set out for her home preceded by my lady. There I was introduced to Fido, a big red dog, bigger than I was it seemed. If I had any misgivings at the outset, I was doubly alarmed now at the prospect of leading that animal downtown. When the front door opened and the dog viewed the great outdoors, he bounded out so quickly, he nearly took my breath away. Fortunately I clutched the rope and he dragged me pell mell down the steps. Gaining the sidewalk he hauled me after him at headlong speed until we reached the car line. I held him there by tying the line around a trolley pole. It was a good strong pole and it held. I dared not let go the rope. I'd lose my job if I lost the dog, I figured. The brute hesitated about boarding the trolley, but an impatient conductor with a brawny arm grabbed the line and yanked the protesting canine onto the car. The dog was evidently cowed by this drastic man-handling and behaved like a well trained poodle for a spell, but while the car was in motion he started to get troublesome again. He kept running up and down the aisle of the car, while I tried frantically to steer him from the laps of the passengers. It was with genuine relief to myself and the passengers when the journey terminated and the dog scampered off the car as fast as his legs could carry him with me on the other end of the rope hanging on for dear life.

Fortunately for me, I found his master in the first hotel where I inquired. The dog knew it, too (he might have smelt his master's breath) for when I started to open the door, he impatiently thrust it open wide with his snoot and with a bark of triumph shot in suddenly, dropping me on my back; and with a strength unbelievable he dragged me into the inner room, where the bar-room was located, and pounced upon his master in loving embrace.

The dog and master were then happily united, but alas, the poor messenger boy was left with a ruffled temper, a trembling heart, and a once new blue uniform which would need mending from a skilled tailor. The liberal tip of a half-dollar went a long way to make amends for these inconveniences.—*Telegraph World.*

Telephone Development in the Argentine Republic

The superintendent of telephones of the department of posts and telegraphs in Argentine, according to U. S. Vice Counsel E. Kitchel Farrand, Buenos Aires, made public a statement on April 10, 1924, in which he sets forth figures and general statistics showing the present magnitude of the telephone service of Argentina.

There are at present, according to the statement, 97 telephone companies throughout the republic. The service is concentrated in the provinces of Buenos Aires, Sante Fe, Cordoba, Entre Rios, Corrientes, Tucuman, and the Territory of La Pampa.

There are 30,250 kilometers of general service line within the borders of Argentina, which, when added to the 640,150 kilometers used as private and railway lines, brings the grand total for the republic to 670,150. Over 700 distinct localities are served.

It requires 70,000,000 Argentine pesos worth of equipment to carry out the needs of the service, which in turn yields an annual gross revenue of 17,000,000 pesos and furnishes employment to 6,900 employees.

Argentine ranks first in South America in telephone service. Of the telephone equipment in all of South America 42 per cent is in Argentina, and the total line length represents 51 per cent of South America's total.

Many automatic telephones have been installed in the city of Buenos Aires during the past year. The six-number dial system is used. The installation of the automatic telephone has not yet reached the point where it has displaced the manual telephone, but the two systems are interconnected and it is possible to call an automatic number on the old style telephone and vice versa. Apparently satisfactory results are being obtained by this arrangement.

The telephone service throughout the Argentine republic is being improved and extended, but it does not appear that the companies are anxious to invest in new equipment as fast as the growth of the demand would justify.

It is especially hard to secure the installation of new telephones in homes. Many persons living in Buenos Aires have had their applications for the service on file for over a year and have not yet received their telephones. Many subscribers have purchased their own sets in order that there may be no delay in securing tthe service.

Most of the telephones in use in Argentina are of English and American manufacture, a large percentage being made by an English branch of an American company.—*Telephony.*

It will only cost you $2.00 per year to become a permanent subscriber to Telegraph and Telephone Age.

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A Frontier Wedding by Telegraph

By Chas. M. Clark

I have before me, the Western Union News, for January, 1916, on the front page of which appears a Photostat of the Old United States Military telegraph office at Maricopa Wells, Arizona, with accompanying remarks, I believe that I am the one person remaining whose picture is there shown, and this statement is "Irish" on the face of it, as I was "behind the pole" in the picture.

A considerable amount of water has passed under the bridge since the picture was taken, in 1874.

Some time previous I was working as Operator for L. H. Haskins, General Superintendent of the old Northwestern Telegraph Company at Milwaukee, when an opportunity offered to join a party being made up to go to Arizona to build and operate telegraphs for the Government. W. J. Lloyd with whom I was "first in, first out," messenger boy under Bob Fowler at Dubuque, Iowa, and who is now in Denver, Colo., was at the time messenger at McGregor, Iowa. I called him up, and told him of the opportunity to go west and grow up with the country, under favorable conditions as to salary, etc., but he declined to join me. I went to Washington, D. C., where the party was forming, leaving there in the fall for San Francisco, Cal., thence by steamer to San Diego, where we were to take the stage across the Colorado Desert into Arizona. In due time, we reached San Francisco, where we laid over two or three days waiting for sailing day of the steamer, which was to take us to San Diego. Leaving San Francisco on the old "Ancon" (a rolling tub, if ever there was one), we reached Wilmington Harbor, where we were informed the steamer would lay over twenty-four hours, so we all got horses, and rode to Los Angeles which at time was quite a little city, most of which was clustered about "The Plaza." The Pico House, was the best hotel, and we ate dinner there preparatory to "seeing the town." It did not take very long to see what there was of Los Angeles at that time. At the point where the Angelus Hotel now stands, there was a truck garden from which we purchased some melons, and beyond that, to the south, was little if anything but gardens. About where the Arcade Depot now stands, was a large Vineyard—"Wolfskills." There was the remains of a fort on the hill above the town, which we were told was constructed by General Fremont. There was nothing whatever to indicate the ultimate building of such a magnificent city as the present Los Angeles.

Returning to the harbor, we found a high sea running, and the steamer had moved to a mooring away out near Dead-Man's Island. We were taken out on lighters or barges and "whipped" up from the lighter on board the steamer. The whipping process was new, novel, and hair raising. The victim seating himself in the loop of a rope grasping the rope above his head and, when the lighter fell away, an officer on the steamer gave the signal and the donkey engine did the rest. When they had us high enough to clear the side of the vessel we were swung inboard and released and the "Whip" was returned for another victim.

Arriving at San Diego, we found that the stages for Arizona were booked full for two weeks ahead, so we hunted quarters and settled down to await our turn on the stage. One of the party a youngster named Storey, and myself, found accommodations with a family in which there were two beautiful daughters, of which more anon. Our mornings were spent bathing in the ocean and our afternoons were dedicated to Croquet, which then was a very popular pastime among young people.

When we reported to the officer in charge of telegraphs whose headquarters were at San Diego, he looked us over, and asked if any of us were familiar with the working of a Milliken Repeater. As no one else fell for it, I acknowledged that I had worked on a Milliken and could wire it in. His reply was, you will go to Maricopa Wells where there is a set of Millikens ready to be installed, and where we are now using a "Wood Button." Storey was assigned to Fort Grant, and the rest of the party scattered around the military posts in the then territory of Arizona.

After waiting two weeks or so, Storey and I finally got away from Arizona. Arriving at Maricopa Wells, I found the set of Millikens had been set up and burned out by lightning, so continued the use of the Woods Button which required the throwing of a switch on breaks. Three lines centered at Maricopa Wells, one from San Diego, one from Fort Verde, and one from Tucson, neither of which could work past Maricopa except "through" the button." Believe me that was some job. The "Wells" are situated in the sand hills bordering the Gia River. The thermometers required a second story and attic, and any iron work inside the office stored heat so that you could not bear to rest your hand on it. Right in the midst of the Pima Indians, the flies were a pest, and I often regretted my impetuousity at the time I was asked if I could run a repeater.

About six months after our arrival in Arizona the stage from San Diego, arrived at Maricopa Wells one morning, with one of those San Diego sisters on board, and during breakfast she informed me she was enroute to Fort Grant to be married to Storey. That all arrangements were made for them to be married over the telegraph by a minister at San Diego. All her friends were to be at her parents home, to which a loop was run, and after the ceremony, the wedding dinner was to be served the guests at her home. After breakfast, the stage pulled out with her on board, and two days later reached Fort Grant. Storey had by this time got his soldier messenger broke in to where he could receive four or five words per minute, and was to use him as operator during the ceremony. That old Government line was a single string, black wire thing, hung originally on cottonwood poles, most of which had rotted down, and whenever there happened a heavy dew, it was out of commission until

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he sun came out and dried her out, so, there were frequent legitimate interruptions to traffic.

The fatal evening finally arrived, and after making all arrangements, getting in touch with the minister at San Diego, and a message from the young lady to her parents to the effect that she was happy, the following telegraphic conversation was worked over the line.

Minister at San Diego—Are you ready?

Storey at Fort Grant (through soldier operator) .. ..

Minister at San Diego—Stand up Mr. Storey at the right of lady, her left hand in your right.

Storey (through soldier operator)— . . —.—

Maricopa—Write firm, you don't get through.

Soldier operator——XXXX——XXXX—.

Maricopa—That's better.

Minister at San Diego—Do you take this woman to be your wife—etc:

Storey (through soldier operator)— .. ..

San Diego—Did you get that?

Soldier operator at Grant—Ga g a

San Diego—calling, Ma ma ma

Maricopa— .. .. .. ma

San Diego—S'matter?

Maricopa—Dunno, been storming east all afternoon, string working bad.

Storey, (in person)— ma ma ma ma ma *Godalmity* ma ma.

Maricopa— .. .. .. ma

Storey—S'matter?

Maricopa—d'no, been storming west all afternoon string working bad.

Storey—Say, aint it tough? Been good weather for a month and storms gotta come on right now.

Maricopa—Too bad Bill, cheer up, there don't seem to be much lightning.

San Diego—Say ma, do you gettum east?

Maricopa—Not a dot.

Storey—Say Clark can't you get anything through west?

Maricopa—Not a sign of 'em, better wait awhile, it may clear.

Storey at Grant— — —

any way.

Maricopa—Go to it Bill, I don't blame you, and the chief can't hear you. At ten P.M., after fighting the button for two hours, the storm cleared and the interesting ceremony was successfully concluded.

I never had the nerve to tell Storey, how I held him up on the eve of his wedding, and they forever blamed the weather.

Two Old Telegrams

H. D. Reynolds, superintendent, Buffalo, sends us the following telegrams which he unearthed recently from the debris incident to the pulling down of a building in Potsdam, N. Y., to make room for a modern skyscraper. The telegrams speak for themselves. They are written in a clear legible hand which proves that the quality of the work turned out by the operators in those early days has never been exceeded since.

VERMONT & BOSTON TELEGRAPH LINE.

LIST OF STATIONS AND TARIFF.

From Potsdam to		From Potsdam to		From Potsdam to		From Potsdam to	
Boston, Mass.	60—4	Charlestown, N. H.	65—4	St. Johnsbury,	65—4	St. Albans,	40—4
Lowell,	60—4	Springfield, Vt.	65—4	Newbury,	65—4	Swanton,	30—4
Nashua,	60—4	Bellows Falls,	65—4	Wells River, Vt.	65—4	Rouse's Point,	30—3
Manchester,	60—4	Brattleboro', Vt.	65—4	Hanover, N. H.	60—4	Chateaugay, N. Y.	35—3
Concord,	60—4	Greenfield, Mass.	65—4	North Thetford,	60—4	Malone,	35—3
Franklin,	60—4	South Deerfield,	65—4	Bradford, Vt.	60—4	Potsdam Station,	35—3
Canaan,	60—4	Northampton,	65—4	Northfield,	50—4	Canton,	35—3
Danbury,	60—4	Holyoke,	65—4	Montpelier,	50—4	Ogdensburg,	35—3
Enfield,	63—4	Springfield,	65—4	Waterbury,	50—4	St. Johns,	40—4
W. R. Junction,	61—4	Woodstock,	60—4	Burlington,	40—4	St. Lamberts,	40—4
Windsor,	60—4	S. Royalton, Vt.	55—4	Essex, Vt.	40—4	Montreal,	50—4
Claremont,	60—4	W. Randolph,	55—4				

Connecting with all lines East, West, North & South; United States & Canada.

☞ All messages strictly confidential. No abbreviations or figures used in the body of a message.
Office hours from 8 A. M., to 8 P. M.

J. G. THORNTON, Operator.

Potsdam, Jan 24 1856

By Telegraph from

For H S Humphrey & Co

Send by express
half bbl one sixth ½ C
plates
10 pairs 25 C W VanAlstine

VERMONT & BOSTON TELEGRAPH LINE.

LIST OF STATIONS AND TARIFF.

From Potsdam to		From Potsdam to		From Potsdam to		From Potsdam to	
Boston, Mass.	60—4	Charlestown, N. H.	65—4	St. Johnsbury,	65—4	St. Albans,	40—4
Lowell,	60—4	Springfield, Vt.	65—4	Newbury,	65—4	Swanton,	40—4
Nashua,	60—4	Bellows Falls,	65—4	Wells River, Vt.	65—4	Rouse's Point,	30—3
Manchester,	60—4	Brattleboro', Vt.	65—4	Hanover, N. H.	60—4	Chateaugay, N. Y.	35—3
Concord,	60—4	Greenfield, Mass.	65—4	North Thetford,	60—4	Malone,	35—3
Franklin,	60—4	South Deerfield,	65—4	Bradford, Vt.	60—4	Potsdam Station,	35—3
Canaan,	60—4	Northampton,	65—4	Northfield,	50—4	Canton,	35—3
Danbury,	60—4	Holyoke,	65—4	Montpelier,	50—4	Ogdensburg,	35—3
Enfield,	63—4	Springfield,	65—4	Waterbury,	50—4	St. Johns,	40—4
W. R. Junction,	61—4	Woodstock,	60—4	Burlington,	40—4	St. Lamberts,	40—4
Windsor,	60—4	S. Royalton, Vt.	55—4	Essex, Vt.	40—4	Montreal,	50—4
Claremont,	60—4	W. Randolph,	55—4				

Connecting with all lines East, West, North & South; United States & Canada.

☞ All messages strictly confidential. No abbreviations or figures used in the body of a message.
Office hours from 8 A. M., to 8 P. M.

[redacted] Operator.

Potsdam, Jan 31 1856

By Telegraph from Canton

For H Rodee

If you
have any Buck Wheat
flour like that you
sent Cooke send me
fifty lbs by Stage
tomorrow morning. Answer
D.H.
A O Brown
Send Stage
tomorrow
H Rodee

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New Westinghouse Short-Wave Experimental Station

THOROUGHLY aware that short-wave or high-frequency wave broadcasting will bring forth the greatest future development in radio broadcasting, the Westinghouse Electric and Maunfacturing Company, has completed and has been operating some months now a new, especially designed radio experimental building, erected at a cost of several hundred thousand dollars.

The new building is a one-story concrete and brick structure located on the Greenburg Pike, about a mile East of the Westinghouse Company's East Pittsburgh Works. The site chosen is within a few feet of being the highest spot in Alleghany County and is one of the level spots available on the hills which dot the locality.

The new site of the short-wave stations of KDKA is in direct contrast to its former location, where despite some known drawbacks, transmitting with Hastings, Neb., and England was carried on nightly. When first installed, the short-wave transmitter was located on the top of a nine-story building directly in the heart of the East Pittsburgh Works. Steel buildings, known to have a decided absorbing effect on radio waves, completely surrounded the set and, in addition, it was located in a valley with hills on three sides. As a matter of fact, the main transmitter of KDKA is still located in the same place and it is a matter of radio history that all of KDKA'S transmitting achievements have been accomplished from this set. However, there is a probability that the 326 meter transmitter will be moved to this very desirable new location.

The new radio experimental building has been so designed that all apparatus contained within it is located symmetrically with respect to all other apparatus.

The basement is divided into several rooms. The main basement chamber contains the high-power transformer plant, motor generator sets, filters, chokes and other apparatus. One of the rooms contains a transformer station of the Duquesne Light Company. The remainder of the basement is occupied by the battery room, furnace room, and storage space. Power is brought into the basement through underground ducts from two separate sources, both of which are 4,000-volt, three phase, 60-cycles. This current supply may be stepped up or down as required. The available power supply is in the neighborhood of 250 kilowatts, which can be increased, however, should it be necessary.

With this basement arrangement all bulky apparatus is located out of the transmitting room and is never in sight.

The main apparatus room on the first floor of the building in which are located the oscillator, modulator and rectifier panels is large and spacious, and having windows on all four sides is well-lighted by day.

The rectifier which furnishes high-voltage to the plates of the water-cooled tubes is mounted in a specially designed frame so that every part of the apparatus is accessible. Replacements and observations can be conveniently made because every part of the unit is in full view of the observer. The rectifier has a capacity which can be pushed to 150 kilowatts, if necessary, and is the result of several years of experimenting and pioneering by the Westinghouse Company in short-wave broadcasting.

The rectifier is of the three-phase type, having a tube on each side of the line or a total of six water-cooled rectifier tubes. In front of each tube is a helix of rubber tubing to permit the use of city water to cool the tubes. On the front of the panel is a row of knife switches used to regulate the voltage of the transformers, thus governing the output of the rectifier.

The oscillator panel is of the same general construction as the rectifier panel and makes use of Westinghouse, high-power, water-cooled, copper-anode transmitting tubes. They are not ordinarily subjected to maximum capacity but are usually paralleled. Thus each tube is subjected to about half its rated capacity and an unusually long-life in tubes results. Another reason for paralleling tubes is that operating on the high-frequency waves causes unusual stresses and strains to develop, not encountered in the ordinary radiocasting wavelengths. Therefore, some safety factor is desirable. Immediately behind the tubes is the tuning inductance. In the front of the panel are located the various indicating meters. As in the case of the rectifier every part of the oscillator panel can be observed and replacements made without difficulty. The modulator panel, using the same general type of tubes, has a switching arrangement whereby the number of tubes used and the amount of power used can be regulated. Indicating meters are mounted on the front of the panel and there is also a modulation meter which shows how strongly the energy generated by the oscillator is being modulated.

Adjoining the main room and extending a few feet into it is the control room. The front and extended sides of the room have glass windows so that every part of the apparatus room may be constantly seen by the operator. This room is equipped with amplifying apparatus consisting of two units, one using five watt tubes, the other using 50 watt tubes. The start and stop control switches, line terminals, amplifying connections, etc., all are located in this room. Thus the engineer at his desk can control everything in the station. He also can listen in and hear the signals, thus judging them for quality.

Other rooms on the floor include the main office, sleeping room and shop.

One of the most distinctive marks of the station is the extremely unique short-wave antenna, a special type perfected by Frank Conrad, assistant chief engineer of the Westinghouse Company, and the man who made most of the present records

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possible through short-wave development. The antenna is a copper tube erected vertically with respect to the ground and supported from a pole about 50 feet high. The antenna which has a ball on its one end, is quite rigid to prevent its swaying. Extremely fine results have been obtained from this perpendicular type of antenna. Though only one is now installed there will be several erected at various points about the station to take advantage of the directional effects possible through the different locations.

Wonderful results have been obtained from broadcasting from the new site of the short-wave station. As an example, it is only necessary to state that daylight transmitting was successfully carried on between this station and station KFKX at Hastings, Nebraska, in order to repeat from Hastings, the Republican convention proceedings at Cleveland and the Democratic convention proceedings at New York. Such a feat of daylight broadcasting would not have been believed possible on any wavelength by radio experts a year ago. It is quite safe to say that there is no other station in the world now capable of doing such work.

With the new building and the new apparatus, new and wonderful feats in transmitting may result this winter which will be far beyond that accomplished the past winter. Perhaps the scheme of world-wide broadcasting, first outlined by H. P. Davis, vice-president of the Westinghouse Company which makes use of short-wave stations may become a reality, or at least such a system be started.

———o———

Morse Character Records for Sale

Disc records containing Mr. Edison's personally transmitted message in Morse characters to the telegraph fraternity of America are on sale at this office. These records may be played on an Edison talking machine or on any talking machine equipped to reproduce Edison records. The price of the records are $1.60 each, including carrying charges and insurance.

There are several other telegraph records on sale at the office of Telegraph and Telephone Age. One made by Colonel Robert C. Clowry, formerly president of the Western Union Telegraph Company. This record was made in July, 1921, when Colonel Clowry sent the message, which was recorded on an indestructible record from 195 Broadway to Colonel E. C. Newton at Little Rock, Ark. over a Western Union wire. The price of this record is $1.50.

In 1922 Marvin Hughitt, chairman of the Board of Directors of the Chicago North Western Railroad Company, Chicago, and an old time telegrapher, sent from that city a message in Morse characters which was copied on an indestructible record in the Edison Laboratory at West Orange, N. J. This record is also on sale at $1.50 each.

Orders for any of these records should be addressed to Telegraph and Telephone Age, 253 Broadway, New York.

Senator Marconi and the Wireless Beam

By a Special Correspondent.

The latest developments in wireless described by Senator Marconi in his recent lecture at the Royal Society of Arts in London, Eng.; are generally admitted to be, at first sight, of rather a disappointing character. There is of course no doubt but that the short-wave will be operated at considerable economy in power on the present system and that a certain amount of secrecy is possible with the directional beam, but there appears to be quite some doubt regarding atmospherics. In one part of the lecture we were told that the receiving reflectors magnify the strength of the received waves and reduce all interference, whether from atmospherics or other stations, but surely it has been generally admitted for many years that magnification of received signals, causes any atmospheric disturbance to be similarly magnified? The reflectors do not prevent interference if other stations are working on the same wave, stated the Senator.

The experiments carried out between Poldhu (Cornwall) and Sydney (NSW) were only during seven hours out of the twenty-four and it would certainly be interesting to know why they could not be continued during the whole twenty-four hours. Then again we are told that with the wireless telephony test which took place on May 30th, no reflector was used. Reverting to atmospheric disturbances, the best that could be said apparently, was that they appeared to be less severe during the day time than those met with on the long-distance waves now employed in wireless telegraphy.

The statement that high-speed wireless telegraphy is only possible on short waves hardly fits in with the present situation. The speed now between London and Paris averages 100 words per minute and at times between New York and London, via Carnarvon, the working speed has reached this figure so that when it is stated that there is no theoretical reason why the new system should not increase the speed a hundred times, the Senator can hardly blame the public if they appear to be a little sceptical.

The results obtained are undoubtedly wonderful but the fact that the communication outlined is only possible during certain hours of the twenty-four does not advance the reliability of wireless communication a great deal, and the particular advantage gained so far as secrecy is concerned, would appear to be at least problematical.

In conclusion, in the absence of further details of practical working, there does not appear to be any cause for uneasiness on the part of cable stockholders whose properties are able to maintain communication the whole twenty-four hours, every day, winter and summer, at much higher speed and far more accurately than the wireless has so far accomplished.

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A Digest of Changes Between the 1921 and 1924 Tax Laws

By H. Archibald Harris.

(*Concluded from page* 359, *August 1st Issue.*)

Gain or Loss—Recognition of

No gain, no loss when corporation in a reorganization exchanges property *solely* for stock or securities in another corproation which is party to the reoganization.—Section 203 (b) (3).

If the corporation referred to above receives, in addition, other property or money the transaction is not entirely tax-exempt unless the recipient corporation distributes such money or other property in *pursuance of the plan of reorganization.* If this is done no gain and no loss.

If, however, the recipient corporation does not distribute it *in pursuance of the plan of reorganization* the gain, if any, shall be recognized and shall be accounted for by the recipient corporation but not in excess of the sum of money and the value of such other property which is not distributed.—Section 203 (e).

Reorganization same as 1921 except that the 1924 act makes the term include a transfer by a corporation if immediately after the transfer, the transferor or its stockholders or both are in control of the corporation to which the assets are transferred.—Section 203 (h).

"Party to a reorganization" is defined as including a corporation resulting from a reorganization and as including both corporations in case of an acquisition by one corporation of at least a majority of the voting stock and at least a majority of the total number of shares of all other classes of stock in another corporation.—Section 203 (b) (2).

Losses—Net

In case of corporations, computation of net losses shall not include dividends allowed as deduction for the tax year.—Section 206 (a) (4).

Personal Service Corporations

Personal Service Corporations are not now recognized. (Was Section 200 (5) of 1921 Act.)

Refunds, Administration

Any income taxes paid by farmer's mutual or other mutual, hail, cyclone or fire insurance companies (if otherwise exempt even though they are not of a purely local character) not outlawed shall be refunded.—Section 1013 (b).

Rates

Corporation income tax rate 12½%—same as 1921

ESTATES AND TRUSTS

Net Income

In computing net incomes of an estate or trust there shall be allowed in addition to other charitable deductions, amounts which under the will or deed of trust are to be used for religious purposes or for prevention of cruelty to children or animals or to a public cemetery not operated for profit (not necessarily contributions to an organization.—Section 219 (b) (1).

In computing the income of any *estate or trust* a deduction shall be allowed for the amount of income which during its taxable year *is to be distributed currently and the income* collected by the guardian of an infant which is to be held or distributed as the court may direct, any such amount to be reported by the beneficiary whether received by him or not. Section 219 (b) (2).

Discretionary trust are allowed a deduction for amounts properly paid or set aside for any beneficiary.—Section 219 (b) (3).

If no part of the income of the estate or trust is included in computing the net income of a beneficiary the credits for dividends and interest on United States obligations are allowed in computing the normal tax of the trust.—Section 219 (c).

Returns of Estates

An estate or trust which has a *gross* income of $5,000 must file a return regardless of its net income. Also must file a return if net income is $1,000.—Section 225 (a) (5).

Tax Paid

Tax shall be computed upon the net income of the trust or estate and shall be *paid by the fiduciary* with two exceptions which are (1) where the grantor of a trust has the power to revest in himself the title to any part of the corpus of the trust and (2) where the grantor may claim the income of the trust or where the income of the trust may be used to pay premiums on insurance policies on his life (except those irrevocably made to charities or such organizations.) (In these two cases the grantor must include the income of the trust in his return.)

GIFT TAX

Beginning January 1, 1924, gifts in excess of specific exemptions are taxable. Rates are 1% of the gift not in excess of $50,000 to 40% of the gift in excess of $10,000,000.—Section 319.

Gift tax is payable on or before March 15th.—Section 324.

Residents of the United States shall pay on sum of all gifts made in the calender year in excess of exemptions. Non-residents on all such gifts of property located in the United States.

Gifts made in property are to be taken at fair market value at date of gift.

Where property is sold or exchanged for less than its money's worth the excess of fair market value of the property over the amount received shall be deemed a gift.—Section 320.

Exemptions Allowed

American citizens or residents.

(1) $50,000

(2) Charitable (etc.) gifts.

(3) Gifts of $500 or less to any person.

(4) Any gift of property which the taxpayer in the five years before making the gift received by gift, bequest, devise or inheritance or which he acquired in exchange for such gift, if the property

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when received as a gift was subject to estate or gift tax.

Exemptions Allowed

Non-resident aliens.

Same as for citizens except the $50,000 exemption is not allowed.

Credits

Credit against estate tax of a donor is provided for amount paid upon any gift which is to be included in his estate.—Section 322.

Returns

To be filed on or before March 15th.—Section 323.

ESTATE TAX

If no executor or administrator appointed and acting within the United States, then "executor" means any person in actual constructive possession of any property of the decedent.

Rates of tax from 1% on net estate not over $50,000 to 40% on estate in excess of $10,000,000.

No exemption for estates of persons dying from injuries incurred or diseases contracted during or in military or naval pursuits as in 1921.— Section 300 (a).

Credit against estate tax shall be allowed for estate or inheritance, etc., taxes paid to any state, territory or the District of Columbia on any property included in the gross estate, such credit not to exceed 25% of the tax imposed by this section—Section 300 (b).

Gross estate includes all property to the extent therein of which the decedent has at any time made a transfer or with respect to which he has at any time created a trust where he could have at his death altered, amended or revoked the transfer or trust or where he relinquished such power in contemplation of death except in case of a bona fide sale.—Section 302 (d).

The Commissioner may extend time for payment of estate taxes five years instead of three—made retroactive to 1921.—Section 305 (b).

Appeals to Board of Tax Appeals must be made within sixty days.—Section 308 (a).

Where tax shown by executor not paid when due, interest runs at 1% a month.—Section 309 (a) (1).

MISCELLANEOUS

Admissions

Takes effect thirty days after enactment of the Act.

No tax on admission less than fifty cents.—Section 500 (a) (1).

Law does not carry 5% penalty for failure to pay.

Where admission to cabaret, roof garden or other similar entertainment is 50 cents or less there is no tax.—Section 500 (a) (5).

To admissions not taxable are added National Guard organizations, Reserve Officers organizations, posts or organizations of war veterans or auxiliary units of any such posts or organizations.—Section 500 (b).

Auto Taxes

Effective thirty days after the enactment of this Act.

No tax on automobile truck or wagon chassis costing less than $1,000. If over $1,000, 3%.—Section 600 (1).

No tax on automobile truck bodies or automobile wagon bodies (including parts or accessories thereof sold with or in connection therewith) costing less than $200. If over $200, 3%.

Sale of trucks or wagons shall be considered a sale of the chassis and of the bodies.

Tires and inner tubes, parts or accessories sold to any person other than a manufacturer or producer of automobile truck or wagon chassis or bodies or other automobile chassis or bodies or motorcycles subject to 2½%.—Section 600 (3).

Brokers Tax

$50 tax does not apply to brokers exclusively negotiating purchases and sales of produce or merchandise.

Other brokers who are members of stock or produce exchanges pay an additional tax based on the value of the seat whether they pay the $50 or not.—Section 701 (1).

Capital Stock Tax

No change from 1921 law.

Dues or Membership Fees Tax

Dues paid to a local fraternal organization among the students of a college or university are exempt.—Section 501.

Jewelry Tax

Does not apply to any article costing less than $30.00.

New exemptions—Surgical instruments, musical instruments, eye-glasses, spectacles, silver-plated flat table-ware, or articles used for religious purposes. Does not apply to watches sold or leased for less than $60.—Section 604.

Occupation Tax

In case of automobiles used in carrying school children to and from school the $10.00 tax does not apply.—Section 701 (8).

Stamp Taxes

Tax does not apply in case of stocks and bonds issued by domestic building and loan associations *substantially all* of the business of which is confined to making loans to members.

Rates on sales of produce on exchange reduced from 2 cents to 1 cent per $100 or fraction thereof.

Stamp tax on playing cards raised from eight cents to ten cents.—Section 800.

General Miscellaneous Taxes

Mah-Jong, pung chow, and parts thereof, 10%.

X-Ray films and plates exempt from the 5% tax.—Section 600 (5).

Tax and Penalties Repealed on

CARPETS, RUGS, TRUNKS, VALISES, PURSES, LAMPS, FANS, ETC.

CANDY.

CEREAL BEVERAGES AND SOFT DRINKS.

CIRCUS.

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DIRK KNIVES.

DUES OR MEMBERSHIP FEES PENALTY OF 5% FOR FAILURE TO PAY TAX.

HUNTING AND BOWIE KNIVES.

JEWELRY TAX 5% PENALTY FOR FAILURE TO PAY.

LIVERIES, LIVERY BOOTS AND HATS, RIDING HABITS, HUNTING GARMENTS.

MOTION PICTURE FILM TAX ON LEASES FROM ONE AFFILIATED CORPORATION TO ANOTHER.

SMOKING STANDS.

STAMP TAX ON DRAFTS, CHECKS AND PROMISSORY NOTES.

TELEPHONE AND TELEGRAPH MESSAGE TAX.

YACHTS, MOTOR-BOATS AND CANOES.

$15.00 TAX ON PUBLIC EXHIBITIONS NOT SPECIFICALLY DESCRIBED.

5% PENALTY FOR FAILURE TO PAY EXCISE TAXES.

Radio Filter Condensers

BY D. G. LITTLE, RADIO ENGINEER
Westinghouse Electric and Manufacturing Co.

THE use of condensers in radio transmitting sets for reducing the commutator hum of the direct current generator or the ripple voltage of the rectifier has increased greatly in the last two years. This is largely because amateurs and the listening public in general are becoming more critical about the quality of transmission and demand that generator noise and hum be reduced to a minimum. The use of rectifiers for supplying plate voltage has also greatly increased because the amateur has found that a filter consisting of inductance and capacitance that will quiet a noisy generator will produce even better results when connected to a rectifier.

Filter condensers for use on direct current voltages up to 2000 volts are relatively simple and inexpensive. For voltages of 2000 to 5000, however, the problem is more serious, requiring that low losses and extremely high insulation resistance be maintained in the condenser if it is to give satisfactory service. The Westinghouse Electric and Manufacturing Company has developed such a condenser for direct current application which is built in units with capacities of 1 to 3 microfarads and voltages of 3500 and 4500. For higher voltages, these units are connected in series and provided with suitable equalizing resistances.

The insulation resistance per unit average 1000 megohns and the efficiency is 99.8% or over.

At the present time several hundred of these condensers are giving very satisfactory service. Forty-eight of the 3 microfarad 3500 volt units are employed at each of the Westinghouse broadcasting stations, KDKA, KFKX, and WBZ while KYW uses 10 of the same size units.

Formation of a Dutch Subsidiary

THE German Allgemeine Elektrizitats Gesellschaft has formed a Dutch subsidiary called International Allgemeine Elektrizitats Gesellschaft, with a paid up capital of 5,000,000 guilders.

The Eleventh Annual Meeting and the Third Annual Meeting of the General Assembly, Telephone Pioneers of America, October 10th and 11th, 1924

Chicago has been selected as the place of the Nineteen Twenty-four meeting because of its central location and because it affords ideal hotel accommodations for Pioneers and their guests who will probably be in attendance.

A further reason for the selection of Chicago is the fact that an opportunity will be given those who attend the meeting from a distance to visit the nearby Hawthorne plant of the Western Electric Company and see, for the first time, telephone equipment in the making.

Here is a city in itself made up of over one hundred buildings covering some eighty acres where 35,000 of our fellow telephone workers are doing their part in the big job of giving America a nation-wide telephone service. Last year the deliveries of this plant to the telephone companies totalled $186,000,000, including an annual output for the cable plant of twenty-four billion conductor feet.

The opportunity to see this tremendously big job in the doing is one of the outstanding features of the Nineteen Twenty-four meeting.

No "Host Company." This meeting will be held under the plan adopted at a recent conference between the Executive Committee and delegates from the various chapters. Under this plan there will be no "host company." The members of Theodore N. Vail Chapter No. 1 have, however, volunteered to assisted the National Secretary in making arrangements for the Nineteen Twenty-four meeting, by organizing local committees.

This plan will greatly simplify the work of arranging for the meeting, *provided the national and local committees receive the wholehearted co-operation of all Pioneers who expect to be in attendance.*

Pioneers are particularly urged to note that all applications for reservations and requests for information will be handled by the National Secretary, R. H. Starrett, and should be addressed to him at 195 Broadway, New York. *All reservations must be in his hands not later than October* 1.

The Edgewater Beach Hotel has been selected as headquarters. This hotel is large enough to provide not only rooms for meetings and entertainments but lodging for all who attend.

THURSDAY, OCTOBER 9TH—EVENING.

Registration of Pioneers and other visitors. General "get together" at hotel with music and dancing.

THURSDAY, OCTOBER 9TH—8 P. M.

General Assembly. The third meeting of the General Assembly will be held at the headquarters, Edgewater Beach Hotel, on Thursday, October 9th, at 8 P. M. All Members of the General Assembly are requested to be present at the roll call.

FRIDAY, OCTOBER 10TH—10 A. M.

Annual Meeting. The eleventh annual meeting of the Association will be held at the headquarters, Edgewater Beach Hotel, on Friday, October 10th, at 10 A. M.

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(Speakers to be announced later.)

FRIDAY, OCTOBER 10TH—AFTERNOON.

In accordance with the wishes of the Pioneers, Friday afternoon has been left open to the Pioneers to follow their own plans and desires.

FRIDAY. OCTOBER 10TH—EVENING.

Moving pictures featuring the telephone business and dancing at the Edgewater Beach Hotel.

SATURDAY, OCTOBER 11TH—MORNING.

The Pioneers will be taken on a visit to the Western Electric Company's plant at Hawthorne. Buses will leave Edgewater Beach Hotel at 8 A. M. and return from Hawthorne, leaving at 11.45 A. M. The party will be returned to the hotel by way of the business district. Buses will stop to drop members of the party who wish to remain downtown.

SATURDAY, OCTOBER 11TH—AFTERNOON

Left open to the Pioneers to follow their own inclinations.

SATURDAY, OCTOBER 11TH—EVENING.

An informal entertainment by telephone people under the auspices of Theodore N. Vail Chapter No. 1 will be given at the Edgewater Beach Hotel.

The Edgewater Beach Hotel has quoted the following rates for lodging:

Single room, $4.00 a day.

Two or more in room $3.00 a day per person. All rooms provided with bath.

The single rooms are limited in number. In most cases it will be necessary for two or more Pioneers or members of their family to occupy a room together. Pioneers expecting to attend should select those with whom they wish to room, and make reservations accordingly. Pioneers who will be accompanied by members of their immediate families should notify the Secretary and reservations will be made for them.

A special rate of a fare and one-half for the round trip has been secured from the various railroads. You will receive from the National Secretary a railroad circular, together with a certificate, which when presented to your local ticket agent will entitle you to this reduced rate.

There are two obligations entailed in this low rate.

(1) The return ticket must be validated by railroad representatives at Chicago before it is good for the return trip.
(2) The return trip must be made by the same route by which you came.

Railroad representatives will be at the Edgewater Beach Hotel to make arrangements for return transportation and Pullman reservations for others than Pioneers and their guests traveling on special trains.

Pioneers should get in touch with the secretaries of their local chapters for full information in regard to special trains and cars.

R. H. STARRETT, *Secretary.* A. L. SALT, *President.*

The Care and Handling of Quadruplex Apparatus—Adjusting for Greatest Efficiency

SHAKESPEARE never penned truer words than when he wrote: "If 'twere done when 'tis done, 'twere well 'twere done quickly."

This applies with particular force to the adjustment of all telegraph apparatus, and especially to those instruments employed in the multiplex systems. Every operator who has worked a duplex or a quadruplex circuit knows that there is nothing so trying to the nerves as to be compelled to receive messages when the incoming signals reach him with that degree of uncertainty which leaves him in doubt as to whether he should trust them or not.

A properly balanced and nicely adjusted duplex or quadruplex should show none of those harassing aggravations, and the period of good work—that is the interval between a perfect balance and the time when outside influences again interfere—may be extended to a degree that may surprise many who have never taken the pains to note the satisfaction derived from a thorough first adjustment of all the parts of the apparatus.

In order to successfully bring about this desirable condition one must necessarily thoroughly understand not only the general principles of the multiplex, but he should be familiar with each annoying feature and know the antidote for every ill to which the system is susceptible.

The polechanger has a tendency to "spark," the contact points of the transmitter are liable to interfere with the proper division of the current through uneven adjustment; the "static" discharge from the main line breaks up the incoming signals, and various other antagonists help to hinder proper action of the apparatus..

It is plainly evident, therefore, that each element of opposition should be weakened to the lowest degree lest their combined strength make an effective hindrance.

Now, there are certain conditions of the circuit and positions of the apparatus that will develop each element of annoyance to the highest degree, and it goes without saying that a chief operator when balancing should force these conditions and see that the multiplex works satisfactorily under the severest test.

We will endeavor to point out these guiding marks, in the hope that some of the readers will verify them by actual experiments. Let us begin by balancing a polar duplex and see what will develop. Theoretically, after the armature of the polar relay has been centered, while the wire is grounded at both ends, and the rheostat adjusted so that the armature will still remain centered while the home battery is "cut in," and the static "kick" apparently eliminated by the pegs in the condenser, the apparatus is supposed to be ready for operation. Perhaps it is, but there is a possibility that it is not. That depends very much upon the manner in which the work was done. In other

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words the balance may not have been given its hardest test. For a demonstration, let us suppose that the balance was a hurried one, or that the distant "ground" was sufficiently abnormal to have caused a slightly incorrect adjustment of the rheostat. If such was the case, had the key at the home office been closed a moment and the writing of the distant office observed, and the experiment repeated with the key open, it is more than probable that in one position the signals would have seemed very light, while in the other position they would be too heavy.

This was not noticed because the home key was probably manipulated so rapidly, while listening to the incoming signals, as to cause them to improve and apparently sound readable. The explanation is that by reversing the current so rapidly the two extremes were halved. Had this been discovered in the first place the rheostat would have been further adjusted until the signals were perfect with the key either open or closed. This plan should always be followed on poor wires and in wet weather for by so doing a working margin is gained.

BEST POSITION OF RELAY CONTACT POINTS WHEN ELIMINATING THE STATIC KICK

When eliminating the static one should follow a line of procedure that almost suggests itself. A close observer will notice that if he reverses his pole-changer—that is, opens or closes his key—while the contact points of the relay are closed, the "static" discharge of the line if not properly equated for, will cause these contact points to momentarily separate, in a manner similar to that produced by a sudden jar of the desk, but its duration is so short that the lever does not have sufficient time to more than make a start towards the back contact before the resumption of normal conditions replaces it. This suggests that the hardest static test we could give the relay will be when both batteries are cut in and the distant office has the key closed. When our home relay is "closed," the distant office must necessarily be in the act of making a signal, hence it is at that moment only that the line discharge can break up a signal. Is it not evident, then, that we should set our apparatus at its "danger" point and stand by it until the enemy is routed? If the enemy is harmless in his strongest position, we have nothing to fear from other combinations or situations.

Notwithstanding this self-evident fact, however, there are many who adjust the condenser while the armature of the home relay rests upon the back contact point and seem to be satisfied when the kick can no longer be heard. They apparently forget that the "sound" of the kick will disappear with a less amount of "static" eliminated when the lever rests upon the backstop than when the contact point, because in the former position the armature must cross the intervening space before it can produce a signal, while in the latter it needs must make a start. There is, therefore, a possibility that you may have left the enemy strong enough yet to do harm when the relay contact points are closed.

EFFECT OF GIVING THE RELAY ARMATURE A BIAS

There are some who believe they are equally successful in equating by giving the armature a temporary bias in order to make it more sensitive, but no one will deny that by so doing he practically destroys the line balance magnetically. Of course there is afterwards an endeavor made to replace the lever in its former position, but such an action is plainly mere guesswork. If there are any readers who doubt this statement, let them try the plan on a poor wire, and after saving recentered the lever, as they believe, again "ground" the circuit at each end. It will be found that the experiment may have to be repeated many times before the armature can be found accurately enough "centered" to remain where placed without further adjustment.

To make matters worse, after having thus destroyed the magnetic equilibrium of the main and artificial line, frequently attempts are made to mend matters by readjusting the rheostat, while the distant office "writes."

When the apparatus is finally considered balanced, what are the actual conditions under which the operator is expected to work? Simply these—a practically "lop-sided" relay, and a false line balance. It may work satisfactorily at the start, but the margin is very small, and a slight change in the atmospheric conditions may necessitate another balance.

Telegraph Company's Plight

THERE is an unpleasant reminder in the annual report of the West India and Panama Telegraph Company that its operations may cease at any moment owing to the difficulty of competing with the Government service. The case of the company is a hard one, and does not encourage pioneer work. Should liquidation result there will be nothing for the ordinary or preferred shareholders, and only a moiety for the Debenture holders. This has long been recognized in the market quotations for the company's securities, the fact that they have any price at all being due to the uprising from time to time of a speculative demand in the hope that the position may change for the better. Perhaps the fact that the company succeeded in making last year the small profit of £3,055 may stimulate this hope, but it seems a forlorn one.

A. I. E. E. Appointments

PRESIDENT-ELECT, Farley Osgood of the American Institute of Electrical Engineers, has appointed the following members of the Institute's Publication Committee for the year 1924 and 1925: Donald McNicol, chairman, and Messrs L. F. Morehouse, E. B. Meyer, L. W. W. Morrow and F. L. Hutchinson. Mr. McNicol has served as chairman of this important committee under the past three presidents of the Institute.

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Recalls Burns Fete Held Sixty-Five Years Ago

THE 128th anniversary of the death of the immortal Robert Burns, observed in Toronto recently, when the Burns Literary Society placed a wreath on the statue of the poet in Allen Gardens, recalled to the mind of Robert F. Easson the Burns Centenary celebration held in that city sixty-five years ago. Mr. Easson is of Scottish birth, but has been a Canadian since boyhood and has spent most of his eighty-six years in Toronto. For upwards of sixty years he was actively engaged in telegraphy, but he is now living in retirement devoting much of his attention to his rose garden at his residence, 37 Willcocks Street.

In the life of an operator who has followed the telegraph business for a great many years, events diversified, interesting and memorable must necessarily come under his ken. Some of these are of course, owing to attendant circumstances, imprinted more vividly on his memory than others. The Burns Centenary held January 25, 1859, would appear to be a notable instance. In Toronto where there have always been so many influential and enthusiastic Scotchmen, the celebration of the poet's birth was conducted with much heartiness and success.

"First, a dinner in honor of the occasion was given at the Rossin House," Mr. Easson relates. "The late Sir Daniel Wilson presided and it was a rather select, dignified affair, attended by most of the leading professional and business men. But the biggest and most popular part of the celebration was held in St. Lawrence Hall where addresses were delivered by prominent gentlemen, followed by a supper and ball. Through the courtesy of the late H. P. Dwight, who was then superintendent of the Montreal Telegraph Company's lines in upper Canada, wires were run into St. Lawrence Hall, connecting it with all parts of Canada and the United States, and messages appropriate to the occasion were exchanged during the evening between Toronto and other Canadian and American cities. Those sent to Toronto were received over this wire by means of an instrument placed on the platform convenient to the chairman, handed to him to be read to the large and jubilant audience which filled the hall.

"It is no uncommon thing nowadays to have telegraph wires carried into buildings where large meetings are being held to facilitate the proceedings but, I believe, the Burns Centenary was the first occasion in Canada on which such a thing had been undertaken, and I remember that it was looked upon then as a very ingenious and enterprising arrangement. I was detailed to act as operator at the Hall, and this I considered no small honor.

"All the addresses were good. Alex McLachlan spoke of Burns as only a brother poet can speak, and read a beautiful poem which he had written for the occasion, dedicated to the memory of the bard. The Hon. John Hillyard Cameron, who could also write good poetry, read an original and in his own fascinating manner delivered an excellent address. He was a finished orator and one of the most gifted men in the country. Dr. Connon (not Dr. Connor, though the later was present) delivered an address and read 'Tam O'Shanter.' The Mayor who acted as chairman, the late Sir Adam Wilson, delivered a capital address, Dr. McCaul, of Toronto University, said some glorious things about Burns. A noted vocalist of those days J. D. Humphries, sang 'Bonnie Dundee' and other Scotch songs, but the piece de resistance of the evening was D'Arcy McGee's oration.

"Sir John A. Macdonald used jokingly to say of himself that he 'wasn't much to look at, but was a good 'un to go.' Well, D'Arcy McGee wasn't much to look at but he spoke like an angel. It was said that his address on that occasion was the best among the many eulogies of Burns delivered on this continent, not even excepting that by Henry Ward Beecher on the same night and same subject, which was considered a marvelously brilliant and sympathetic effort. When D'Arcy said, "Wherever on the face of the earth—at least in English-speaking regions—there is a Scotchman, or a Man, Robert Burns is not to-night without honor," he thrilled the Scotchmen through and through and they fairly yelled.

"Most of the leading judges, professional men, educational and commercial men were present—Scotchmen, Englishmen, Irishmen and Canadians, including the Hon. George Brown, Chief Justice Sir John Beverley Robinson, Sheriff Jarvis, Vice-Chancellor Spragge, Judge Draper, Hon. P. M. VanKoughnet and Sir Oliver Mowat. All classes and conditions of people were represented—Presbyterians, Angelicans, Methodists and Roman Catholics. Everybody seemed to know everybody, and all had apparently set out to meet on common ground. All were Scotchmen for that night anyway. "Hoo's a' wi' ye the nicht?' and 'Brawly, thank ye for speerin',' were heard in all directions. Of course it was in all cases the real vernacular of the Land o' Cakes, but what matter about that?

"As the ball progressed I witnessed what perhaps nothing on earth could have brought about but a Burns Centenary (remember, politics ran high then), and that was the extraordinary spectacle of D'Arcy McGee (representative Roman Catholic,) and Hon. John Hillyard Cameron (head of the Orange Society,) dancing together in the same Scotch reel! Bye and bye, Hon. George Brown took a hand in it—should I say a foot in it?—and they kicked up their heels, snapped their fingers, and hooted and 'hooched' and 'heighed' making those vocal noises peculiar to Scotchmen when they get warmed up to the bag pipes and the dance.

Direct Cables Between Italy and South America

ANOTHER stage in the plan for direct cable communication between Italy and the Argentine is announced by the information that the Argentine government has granted the Italian cable company the concession to lay additional cables between the River Plate and Montevideo.

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EDITORIAL COMMENT

David Homer Bates

July 29, 1924.

Dear Mr. Taltavall:

It was my great pleasure one day last week, while motoring from Spring Lake Beach, N. J., to New York, to stop at Allenhurst, N. J., to see my dear and much esteemed friend and former chief, D. H. Bates. Mr. Bates and his wife are stopping for the summer at the charming cottage of their son, D. H. Bates, Jr., Esq., 218 Elberon Avenue, Allenhurst, N. J.

The friends of Mr. Bates, and their name is legion, will be glad to learn that Mr. Bates' health is very much improved. He has been receiving insulin treatment for some time and he informed me his sugar content is now almost nil. For a time he used crutches to get around, but now a stout cane suffices. His face is full, and so far as I could observe shows no signs of illness. His figure is as erect, his eyes as keen and his voice as strong as I remember them in his palmiest days, over forty-five years ago. He spoke of the old Baltimore and Ohio Telegraph Company days and he asked me if I had read his reminiscences relating to that company in your Journal of November 1, 1923, which of course I had and with great interest.

Mr. Bates' strength, although steadily improving, does not yet permit him to do much walking, but with his wife, son and daughter-in-law he motors all over the beautiful highways of South Jersey.

Mr. Bates is now an octogenarian and really he bears his years splendidly. His friends will, I am sure, join me in the hope that he will be with us for many years to come.

It is Mr. Bates intention to take up his old quarters in the Hotel Ansonia the coming winter, with his family.

WM. WAVER, JR.

A Newspaper Equipped with Wireless

WHEN Senator Paul DuPuy, of *Le Petit Parisien*, France, came back from a recent trip to America he was full of the ideas that he had got of the progressive attitude of the big American newspapers. Chief among these ideas was the value of broadcasting to the big newspapers in the States.

Therefore Senator DuPuy promptly got his directors together, and it was decided to buy a broadcasting station. *Le Petit Parisien* which in spite of the "*petit*," meaning little has the largest circulation in France, reaching almost a million and a half daily. The various types of broadcasting station were carefully considered, and at last a Western Electric set was bought and installed.

Le Petit Parisien works on 340 metres, and is one of the most successful concert stations in France. Due to the fact that they are on two different buildings, one higher than the other, the two aerial masts are of slightly different heights, one being about 78 ft. and the other 81 ft.

The aerial is a three-wire flat type, 110 ft. long. The input is 1,600 watts. A counterpoise earth is used, as the set is in the heart of one of the most congested districts of Paris. A regular earth would have had to pass through a reinforced concrete building, with probable parasitic troubles.

The microphone is constructed to transmit frequencies from 200 to 5,000 higher than the highest note of the piano. Three stages of audio-frequency amplification are used before the modulating circuit. The valves employed are of the specially oxidized filament type, with platinum filaments, which assures an extra heavy electron emission on a low heating current.

Results have been, as said before, very satisfactory, the station having been heard as far north as the northern section of Norway on two valves, in Algeria, 750 miles south of Paris, in Germany, and at Barcelona, Spain. In London *Le Petit Parisien* station has been heard on a simple crystal set several times.

NINETEEN countries were represented at the meeting of the International Long-Distance Telephony Consultative Committee recently held in Paris, when it was decided to form a permanent commission to further the establishment of long-distance telephonic communication throughout Europe. The headquarters of the commission will be in Paris, and will, it is hoped, form a centre where all information regarding long-distance telephony will be collated and made available to the authorities in all the principal European countries.

Rail Telegraphers Get More Pay

THE Railroad Labor Board on July 15th, granted 1,921 telegraph service employees of six railroads wage increases aggregating $8,422 monthly, effective July 16th. The roads affected included the Buffalo, Rochester & Pittsburgh (3 cents an hour); Delaware & Hudson (1 cent an hour), and the New York, Ontario & Western Railway (4 cents).

Coming Conventions

OLD Time Telegraphers' and Historical Association, Hotel Roosevelt, New Orleans, La., October 30th, 31st and November 1st.

Telephone Pioneers of America, Chicago, October 10th and 11th.

Telegraph and Telephone Section of the American Railway Association, Hotel Frontenac, Quebec, Que., September 9th, 10th and 11th.

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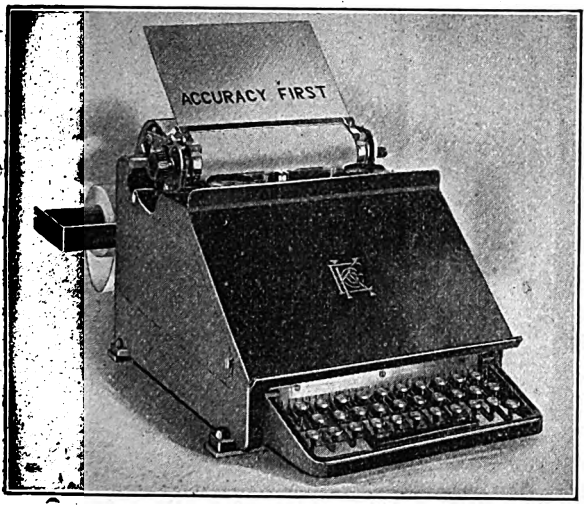
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER

AN ENTIRE SYSTEM IN



ONE SIMPLE TYPEWRITER UNIT

Not Merely A New Design.

A Revolutionary Change.

The Unit that proves in on lightly loaded circuits.

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TELEGRAPH AND TELEPHONE

EDISON PRIMARY BATTERIES--

fulfill all requirements of railroad telephone service

Efficient apparatus is of little value in getting good results in railroad telephone service, unless the battery supplying the energy is dependable, suitable to the apparatus with which it is used, able to deliver the required current over long periods of time, economical in first cost and also in maintenance cost.

Edison Primary Batteries fulfill all the requirements,—

—they do not cease to function abruptly, even for short periods,

—have a low internal resistance and are therefore suitable for low resistance transmitters commonly used,

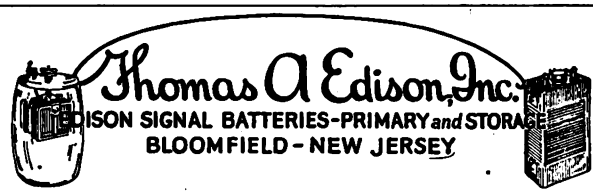
—have ten to twenty times the capacity of dry cells,

—supply electricity at a less cost per ampere hour than any other types of battery, and,

—most important of all, are economical in replacements and in maintenance cost,

—the "stand-by" life of an Edison Primary Battery is indefinite, depending on whether the capacity is consumed in two months or two years.

For real telephone satisfaction, use Edison Primary Batteries.



ST. LOUIS Railway Exchange Bldg. CHICAGO Peoples Gas Bldg. SAN FRANCISCO Balboa Bldg.

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association.

THE Eighth Session, Annual Meeting of the Telegraph and Telephone Section will be held at the Hotel Chateau Frontenac, Quebec, P.Q., on September 9, 10 and 11. The first day's session will convene at 9:30 a. m. (Quebec City Time.) The reports of the following Committees will be presented. Committee of Direction. (Business transacted since last session.)

Committee No. 1—Construction and Maintenance—Outside Plant. Sub-Committee "A"—Construction and Maintenance of Pole Lines, Wires and Cables. Sub-Committee "B"—Wire Crossings. Sub-Committee "C"—Underground Construction. Sub-Committee "D"—Transpositions.

Committee No. 2—Construction and Maintenance—Inside Plant. Sub-Committee "G"—Apparatus, Material and Tools. Sub-Committee "H"—Locations and Layouts. Sub-Committee "J"—Circuits and Current Supply. Sub-Committee "K"—Installation and Maintenance.

Committee No. 3—Protection Against Electrolysis. Committee No. 4—Electrical Protection. Committee No. 5—Telegraph and Telephone Development. Committee No. 6—Message Traffic. Committee No. 7—Inductive Interference. Committee No. 10—Education and Training of Telegraph and Telephone Employees. Committee No. 11—Telegraph and Telephone Transmission. Committee No. 12—Radio and Wire Carrier Systems. Committee on Nominations. Committee of Direction—Nominees for Committee on Nominations. Committee of Direction—Nominees for Committee on Nominations.

The following papers will be presented.

"A. C. Mil-Ammeter Method of Testing Open Wires" by R. T. Davenport, plant supervisor, Postal Telegraph-Cable Company.

"Effects of Aurora Borealis on Communication Circuits and Means of Mitigation" by John B. Taylor, consulting engineer, Lighting Department, General Electric Company.

"Machine Switching Private Branch Exchange Switchboards and Their Application to Railroad Service by American Telephone and Telegraph Company.

1. "Transmission Maintenance—Trouble Location on Telephone and Telegraph Circuits" by American

"REMCO"
ALTERNATING CURRENT SELECTORS
[Controlling Patents]
Tested and Proved
Manufactured only by the
RAILWAY ELECTRIC MANUFACTURING CO.
135-137 Sycamore St. Milwaukee, Wis.

REPEAT ORDERS ARE THE REAL TEST OF THE PRODUCT

MORKRUM APPARATUS ABROAD

In 1923 the Australian Government purchased six Morkrum Page Teletypes equipped with Typebar Printers.

As a proof of the reliability of Morkrum apparatus, they have placed another order for over 100 MORKRUM TYPEBAR PRINTERS.

MORKRUM COMPANY

CHICAGO
1410 Wrightwood Avenue

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726 World Building

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Telephone and Telegraph Company.

2. "Preservative Treatment of Poles in Existing Lines by the Charring and Spraying Process" by P. J. Howe, construction engineer, Western Union Telegraph Company.

Officers, members of Committee of Direction and Committee on Nominations will be elected at the session.

All members are requested to arrange to be properly represented at the session.

Business Session

TUESDAY, SEPTEMBER 9.

9:30 A. M. Call meeting to order.
9:35 A. M. Registration of Representatives of Members, Affiliated Members and Visitors.
9:40 A. M. Approval of minutes of Session held September 18, 19 and 20, 1923.
9:45 A. M. Announcements and appointments of Committee on Resolutions.
9:50 A. M. Remarks by Chairman.
10:05 A. M. Report of Committee of Direction.
10:20 A. M. Report of Committee No. 1—Construction and Maintenance—Outside Plant.
10:30 A. M. Report of Sub-Committee "A"—Construction and Maintenance of Pole Lines, Wires and Cables.
12:00 Noon Adjourn for luncheon.
3:00 P. M. Continuation of Report of Sub-Committee "A"—Construction and Maintenance of Pole Lines, Wires and Cables.
3:15 P. M. Paper entitled "Prolonging the Life of Our Pole Line Timber" by P. J. Howe, construction engineer, Western Union Telegraph Company.
4:00 P. M. Paper entitled "Machine Switching Private Branch Exchanges "and Their Application to Railroad Service" by W. H. Harrison, Central Office Engineer, American Telephone and Telegraph Company.
5:00 P. M. Report of Sub-Committee "B"—Wire Crossings.
5:15 P. M. Report of Sub-Committee "C"—Underground Construction.
5:25 P. M. Report of Sub-Committee "D"—Transpositions.
5:35 P. M. Adjourn for day.

WEDNESDAY, SEPTEMBER 10.

9:30 A. M. Report of Committee No. 2—Construction and Maintenance—Inside Plant.
9:40 A. M. Report of Sub-Committee "G"—Apparatus, Material and Tools.
11:10 A. M. Report of Sub-Committee "H"—Locations and Layouts.
11:20 A. M. Report of Sub-Committee "J"—Circuits and Current Supply.
12:05 P. M. Paper entitled "A. C. Mil-Ammeter Method of Testing Open Wires" by R. T. Davenport, plant supervisor, Postal Telegraph-Cable Company.
12:35 P. M. Adjourn for luncheon.
2:00 P. M. Report of Sub-Committee "K"—Installation and Maintenance.
2:15 P. M. Report of Committee No. 3—Protection Against Electrolysis.
2:25 P. M. Report of Committee No. 4—Electrical Protection.
3:10 P. M. Paper entitled "Effects of Aurora Borealis on Communication Circuits and Means of Mitigation" by John B. Taylor, Consulting Engineer, General Electric Company.
4:10 P. M. Report of Committee No. 5—Telegraph and Telephone Development.
4:40 P. M. Report of Committee No. 6—Message Traffic.
5:40 P. M. Adjourn for day.

THURSDAY, SEPTEMBER 11.

9:30 A. M. Report of Committee No. 7—Inductive Interference.
10:00 A. M. Paper entitled "The Detention and Location of Trouble on Telephone and Telegraph Circuits," by H. S. Osborne, Transmission Engineer, American Telephone and Telegraph Company.
11:00 A. M. Report of Committee No. 10—Education and Training of Telegraph and Telephone Employees.
11:45 A. M. Report of Committee No. 11—Telegraph and Telephone Transmission.
12:30 P. M. Adjourn for luncheon.
2:00 P. M. Report of Committee No. 12—Radio and Wire Carrier Systems.
2:30 P. M. Report of Committee on Nominations.
2:35 P. M. Nominees for Committee on Nominations.
2:40 P. M. Appointment of Tellers.
2:45 P. M. Election of Officers, Members of Committee of Direction and Members of Committee on Nominations.
3:05 P. M. Report of Committee on Resolutions.
3:15 P. M. Miscellaneous and New Business.
3:25 P. M. Report of Tellers as to election of Officers, Members of Committee of Direction and Members of Committee on Nominations.
3:30 P. M. Introduction of Officers.
3:45 P. M. Adjourn Meeting.

The following attractive arrangements are to be provided by the Railway Telegraph and Telephone Appliance Association in connection with the Annual Meeting:

MONDAY, SEPTEMBER 8.

8:00 P. M. Informal Reception at the Chateau Frontenac.

TUESDAY, SEPTEMBER 9.

12:00 Noon Entire Party. Luncheon to be pro-

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vided by the Canadian Pacific Railway on board its steamship "Empress of France."

3:00 P. M. Motion Pictures followed by dancing.

WEDNESDAY, SEPTEMBER 10.

7:00 P. M. Dinner entertainment at the Chateau Frontenac. Tickets $2.00 per person. Dancing following.

THURSDAY, SEPTEMBER 11.

2:30 P. M. Luncheon to be provided by the Hotel Department of the Canadian Pacific Railway at the Chateau Frontenac.

FRIDAY, SEPTEMBER 12.

8:00 P. M. Informal carnival at the Chateau Frontenac.

9:00 A. M. Trip in Special Train to be provided by the Canadian National Railways to the Quebec Bridge over the St. Lawrence River. Return to Quebec before noon and then entire party will be taken to Ste. Anne de Beaupre in Special Train to be provided by the Quebec Railway, Light and Power Company's Railway. Luncheon at Ste. Anne by the Appliance Association. On the return trip Montmorency Falls will be visited.

In addition, the Appliance Association is planning o provide sight-seeing trips about Quebec for the adies on Wednesday morning and Thursday afternoon.

RATES AT THE CHATEAU FRONTENAC, QUEBEC, QUE.

The following reduced room rates will apply from Sunday, September 7, to Sunday, September 14.

	Per Day
Double room with bath (2 people)	$7.00
Double room without bath (2 people)	6.00
Single room with bath (1 person)	4.00
Single room without bath (1 person)	3.50

Table d'hote meals will be served in a private dining room for the exclusive use of those attending the Session, as follows:

Breakfast	$1.00
Luncheon	1.25
Dinner	1.50

All those who expect to attend the Session are urged to make arrangements at once for accommodations at the Hotel. In communicating with the Manager, B. A. Neale, it will be advantageous to mention that you are connected with the Telegraph and Telephone Section of the American Railway Association.

Also please advise W. A. Fairbanks, Secretary, 30 Vesey Street, New York, on or before August 15, if you intend to be present at the meeting and how many will be in your party.

The subscription rate for Telegraph and Telephone Age is $2.00 per year. Subscribe for the paper and become one of its boosters.

Radio Corporation of America

GENERAL J. G. HARBORD, President, has accepted an invitation of the commission on international Justice and good will of the Federal Council of Churches of Christ of America, to address the international conference of the commission at Chautauqua during the week of August 18th. His topic will be "Disarmament and Security." He has also accepted an invitation to give the principal address on the occasion of National Defense Day September 12th at Wichita, Kansas.

General Harbord, addressed the weekly meeting of the Rotary Club of Boston at the City Club on Wednesday at 12:30 on the occasion of the official opening of a new transoceanic and marine radio service which operates through a new office of the company at 109 Congress Street.

His address was followed by practical demonstration of both the transoceanic and marine services. These demonstrations consisted of the transmission of two messages, one from Governor Cox to the Lord Mayor of London; the other, from Robert Spurr Weston, President of the Rotary Club of this city to the President of the Rotary Club of London, England. General Harbord, through W. A. Winterbottom, traffic chief of the company, dispatched these messages from the speakers table. Replies from London were delivered to General Harbord before the meeting was over.

Likewise, the Captain of the Steamship Berengaria within the range of the high-power coastal station at Chatham, Mass., was asked to give his ships position. The time required to complete the exchange of messages will be recorded for the purpose of illustrating the efficiency of modern marine radio.

Radiograms for Boston will be flashed across the ocean through the powerful station located at Rocky Point, Long Island, and messages from foreign shores reach Boston in the form of wire telegraph signals picked by special relay stations on Long Island. The Broad Street office of the Company at New York serves as the key relay point in this system. Communication with ships at sea is carried on at Chatham, Mass., through the medium of high powered units. New developments in the sending and receiving methods now permit this station to transmit to three different ships at sea while at the same time five special receiving sets connected with antenna two miles in length are intercepting signals from five different vessels. The Chatham station, serving as a marine radio center, is linked with the Boston and New York offices by private telegraph wires.

General Harbord was accompanied by Messrs. W. A. Winterbottom, Pierre Boucheron and J. L. Bernard of the New York office..

SPEED is the motto of the messenger boys.

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PERSONAL

CHAS. P. BRUCH, former vice-president of the Postal Telegraph-Cable Company, New York, has identified himself with the Telegraph and Telephone Age in the subscription and advertising departments. Mr. Bruch's friends will rejoice with him that he will remain in the telegraph service and he hopes to gain the support of his telegraph friends.

JOHN T. NEEDHAM, president of the Pneumatic Tube Supply Company, Plainfield, N. J., recently spent several days in Canada where his company has work under way installing underground and house tube systems. Through the San Francisco office of the company a considerable amount of tube work has been contracted for to be installed in mercantile establishments.

William A. Porteous, Jr., of New Orleans, La., was a delegate to the Democratic National Convention, New York. It is to Mr. Porteous' credit as a political forcaster that from the beginning of the balloting he was for John W. Davis. Mr. Porteous is a son of W. A. Porteous, superintendent of the Western Union Telegraph Company, New Orleans.

POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice president and general manager, delivered an address on the development of electric telegraphs and arranged for the showing of the film "The Pulse of the World" before the Rotary Club at the Saltauk Hotel, Catskill, New York, August 12th.

W. C. Daviet, vice president, and J. F. Skirrow, vice president and chief engineer, are away on vacation.

The new line being constructed between Fort Worth and Los Angeles has been completed in the section between Fort Worth and El Paso. It is expected that the section between El Paso and Los Angeles will be completed by September 15th.

J. P. O'Donohue, assistant chief engineer, has returned after spending a few weeks at Lake Owossa, N. J.

Rufus Gould, general supervisor of plant, has returned from a visit to his old home in Nova Scotia.

A. Montouri, of Edward Reynolds' office, is spending a few days at Delaware Water Gap.

In the passing of Robert Stewart, the New York main operating department lost one of its most valuable and beloved employees. Mr. Stewart became operator here twenty years ago and in a few years he was assigned to the northern traffic division. From there he went to the quadruplex department. His genial manner of doing business won him many friends in the various cities and many sent regrets on hearing of his demise. He will be greatly missed by all who had the pleasure of knowing him.

Commercial Cable Co.

J. GRAHAM was appointed superintendent of the Company's station at Canso, N. S. on July 1st.

THE WESTERN UNION TELEGRAPH CO.

L. MCKISICK, assistant to the president, has gone on his vacation, which he will spend in Canada.

E. Y. GALLAHER, vice-president of the company, accompanied by Mrs. Gallaher, sailed for Europe on August 2nd.

CORNELIUS CORBETT, formerly superintendent of the Fifth District, Western Division, with headquarters at Detroit, died at his home in that city on June 6th. In 1887 he was made superintendent of the Western Union Telegraph Company, with headquarters at Detroit. A few years later he was transferred to Cleveland, Ohio, where he continued to serve until the Western Union Telegraph Company was bought by the American Telephone and Telegraph Company. Previous to 1887 he acted as manager of the Detroit office.

Mr. Corbett was a unique character in the telegraph service. He was most unpopular with the fraternity and popular with the company.

Pamphlets Received.

WHERE to Seek for Scientific Facts is a pamphlet costing twenty-five cents net, which has just been received from our English correspondents. It is a very useful little book for those who do research work. The object of this book is to indicate where people may find: list of books on various science subjects; books, or journals and proceeding, transactions, and bulletins of learned and scientific societies; indexes of literature and publications and papers on technical and scientific subjects, and abstracts of technical papers.

Telegraphers' Strike

THE Vienna correspondent of the London Times reported on July 18th that the telephone and telegraph operators in the city ceased work for several hours as a protest against their treatment in the "Government Servants' Remuneration Bill." Efforts were being made to obtain better conditions, and in the event of non-success it was proposed to call a further strike, aided by the railwaymen.

Learn The Principles Before You Invest.

LET nine authorities advise you what apparatus is the best before putting your money into a radio set. Learn the principles of operating first and then you can purchase your apparatus intelligently.

There is one book that can give you all the information that you will need and in an entertaining and charming style.

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Canadian National Telegraphs

ON the eve of his departure from the Canadian National Telegraphs to accept a position in the vice-president's office of the Western Union Telegraph Company at New York, Charles E. Davies, assistant general manager was the recipient on Saturday, July 19th, of handsome presents from the officers and staff of the Telegraphs as a mark of the esteem in which he was held and of his twenty years faithful service. The presentation was made by K. Clark, telegraph and telephone engineer, who expressed on behalf of the employees their regret at Mr. Davies severing his connection with the company. The presents consisted of a handsome gold watch and chain and solid gold fountain pen; Mrs. Davies was given a beautiful string of pearls and a large bouquet of American beauty roses. Mr. Davies, in thanking the staff, expressed his gratitude at the way in which they had cooperated with him and of the loyal service they had given during the past.

Herman S. Ingram, who has been appointed superintendent of the Canadian Pacific Railway Company's Telegraphs, Eastern District, at Montreal, was born at Calgary, Alta., February 28, 1885, and first entered the telegraph service February, 1901, since when he has been, to June, 1902, messenger, C.P.R. Co's Telegraphs, Prescott, Ont.; June, 1902, to November, 1903, operator, Great Northwestern Telegraph Co., Montreal; November, 1903 to August, 1904, operator, C.P.R. Co's Telegraphs, Winnipeg; September, 1904, to April, 1905, operator, Great Northwestern Telegraph Co., Montreal; April 1905, to February, 1909, operator, C.P.R. Co's Telegraphs, Winnipeg; February, 1909 to June, 1913, traffic chief, wire chief, Winnipeg; June, 1913 to April, 1915, chief operator, C. P. R. Co's Telegraphs, Winnipeg; April 1915 to April, 1923, inspector, C. P. R. Co's Telegraphs, Toronto; April 1923 to July 1, 1924, superintendent, Traffic and Tariffs, C. P. R. Co's Telegraphs, Winnipeg.

All America Cables

EFFECTIVE immediately "All America" cable facilities are again available to Sao Paulo. Messages are still subject to censorship.

The following codes are permissible—Lieber, Western Union, Scotts, Imperial, Bentley, ABC, 5th edition, Broomhalls and Ribeiro.

MANAGER J. T. SHERIDAN returned to Rio de Janeiro, Brazil, after a furlough spent in the United States and Europe.

Station Electrician C. G. Colliver has arrived at Valparaiso, Chile, for duty.

Manager G. Powell of Guayaquil, Ecuador, left on furlough to be spent in the United States and Canada.

Station Electrician C. C. Searl left Valparaiso, Chile, for Balboa, Canal Zone.

OBITUARY

HARVEY WOLF, aged 36 years, who gave his residence as the Elm Hotel, and who was at one time, manager of the American District Telegraph Company for the Western Union Telegraph Company of Omaha, died on July 27th.

Mr. Wolf was taken to the Central police station early the day before when police officers responded to a "drunk" call. At the time of the arrival of the officers, Wolf was bleeding from the mouth and nose. He was removed to Central police station where he was carefully examined and later removed to the county hospital. It was believed by the police that Wolf had been struck by a car.

Early last year Wolf was arrested for investigation in connection with a charge of impersonating a federal officer, and also in connection with several bad checks he is said to have passed.

During the time he worked with the American District Telegraph Co. police said, he formed affiliations with underworld characters which resulted in his downfall.

A divorce between Harvey Wolf and his wife Mary, is now pending in district court. Mrs. Wolf explained that she will set aside differences and take personal charge of the funeral. Besides his wife he is survived by one daughter, Mary Beth.

JOSEPH F. AHEARN, aged fifty-one years, of the Postal Telegraph-Cable Company, died on July 27th. He was widely known as a newspaper man and a politician in the Bronx, in which Borough he lived for a long time. He was born in the old First Ward at 32 Washington Street and received his education in the public schools, and later served for eleven years as a telegrapher on the New York Evening Journal. He was an organizer and the first president of the Telegraphers' Union.

In 1909 he became editor of the Bronx Home News, and continued in that capacity until he resigned to become Deputy Commissioner of Licenses, under Commissioner George Bell. During the World War, Mr. Ahearn served as Deputy Coal Commissioner of the Bronx.

For Sale

SINCE the death of Thomas J. Dunn on March 31st, 1923, the Dununit transmitting device has not been manufactured. Counselor Jerome J. Dunn, a son of Thomas J. Dunn, is selling out the business and offers for sale the letters patent covering the Dununit and all of the other transmitting devices invented by Mr. Dunn. It will be remembered that T. J. Dunn was the first in the telegraph field to realize the importance of transmitting devices and he associated himself over twenty years ago with the original inventor of the Vibroplex, Horace G. Martin. The patents that are now offered for sale have a life of thirteen years and do not infringe any other transmitting device. For particulars address Dununit, c/o TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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Telegraph and Telephone Life Insurance Association

TO THE MEMBERS:

The following proposed amendments to the By-Laws have been regularly presented to the Executive Committee in accordance with Article VI of the Constitution.

The Annual Meeting held March 12th, and which was adjourned subject to call of the chair, will reconvene October 16th, 1924, to consider the adoption of the proposed amendments to the By-Laws as noted below, and any other business that may properly come before the meeting.

BY-LAWS

ARTICLE I—SECTION 3

PRESENT

Sec. 3. Upon the approval of an application for membership and the receipt by the Secretary of an entrance fee of $2.00, the President and Secretary shall issue, sign and seal with the seal of the Association a certificate of membership.

PROPOSED

Upon the approval of an application for membership the President and Secretary shall sign, seal with the seal of the Association, and issue a certificate of membership.

ARTICLE I—SECTION 6

PRESENT

Sec. 6. Any person of good moral character, who has forfeited membership through non-payment of dues, may be restored to membership upon the same terms and conditions as are required of new applicants except that the entrance fee shall be four dollars and that such applicant for restoration shall not be rendered ineligible to membership by reason of not being in telegraphic or telephonic service.

PROPOSED

Any person of good moral character, who has forfeited membership through non-payment of dues, may be restored to membership upon the same terms and conditions as are required of new applicants and that such applicant for restoration shall not be rendered ineligible to membership by reason of not being in telegraphic or telephonic service.

ARTICLE II—SECTION 5

PRESENT

Sec. 5. The Secretary shall receive all moneys, and deposit the same with the Treasurer, taking his receipt therefor; keep the records, books of account and other papers belonging to the Association; conduct correspondence; issue and attest certificates of membership; and issue notices of assessments. He shall make to the Association, at each annual meeting, a detailed report of its business and shall submit for the action of said meeting a detailed estimate of the regular current expenses for the ensuing year which estimate shall be prepared and approved by the Executive Committee. He shall act, *ex officio*, as Secretary of the Executive Committee. It shall be the duty of the Secretary to publish by advertisement in such newspapers or periodicals as may be designated by the Executive Committee and by circular to the entire membership notices of the annual meeting and of special meetings, together with causes for the latter, and any proposed alteration or amendments to the Constitution or By-Laws. A copy of said circular shall be forwarded to each member at his last known Post Office address not less than sixty days prior to the date of said special or regular meeting or of the meeting at which the proposed alterations or amendments are to be considered.

PROPOSED

Omit the words: "and submit for the action of said meeting a detailed estimate of the regular current expenses for the ensuing year, which estimate shall be prepared and approved by the Executive Committee."

ARTICLE II—SECTION 10

PRESENT

Sec. 10. The officers of the Association, except the Secretary, shall serve without compensation. The Secretary shall act as Clerk for the Association and shall receive such compensation for his services as may be authorized by the Executive Committee.

PROPOSED

Omit Section 10 entirely.

ARTICLE III—SECTION 1

PRESENT

Agents

Section 1. The Secretary, by and with the advice and approval of the Executive Committee, may appoint a number of members to act and be known as Agents of the Association, to hold office during the pleasure of the Executive Committee.

PROPOSED

Omit the word "Agent" and substitute the word "Collector."

ARTICLE V—ADD NEW SECTION

PRESENT

PROPOSED

Suicide

In the event of suicide, whether sane or insane, within one year after the date of issue of the certificate, the amount payable under the certificate shall be the sum equal to the aggregate of the dues actually paid by the member.

ARTICLE VI—SECTION 3

PRESENT

Sec. 3. The Secretary shall, when directed by the Executive Committee, forward to each member printed notices of assessments levied or dues payable. Said notices may be delivered in person or sent by mail or otherwise to each member at his last known Post Office address by the Secretary or by the Agents of the Association, as may be convenient; provided, however, that failure on the part of the Secretary or any agent to forward said notices, or failure of any member to receive any or all.

PROPOSED

Omit the word "Agents" and substitute the word "Collectors."

ARTICLE VI—SECTION 4

PRESENT.

Sec. 4. Payment of assessments and dues to the Secretary or to any duly appointed agent of the As-

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ociation, as hereinabove provided, shall constitute ayment to the Association. The Secretary or gent shall give written receipt for assessments and ues paid when requested to do so.

PROPOSED

Omit the word "Agents" and substitute the word Collectors."

ARTICLE IX—EXPENSE FUND

PRESENT

The following amounts shall be set aside separtely each month for each Division to constitute an xpense fund which may be used to defray the exenses of that Division of the Association:

a. All initiation fees.

b. Not to exceed 25% of the first year's dues of ew members.

c. Not to exceed 1/40 of one per cent of the total ortuary liability in each Division with respect to embers of more than one years standing.

Should the surplus in the Expense Fund at any me be larger than is necessary, a division of the rplus may be made, upon an equitable basis and ransferred to the Reserve Funds of the First and hird Divisions by resolution of the Executive ommittee.

PROPOSED

There shall be established a separate fund known s the "Expense Fund," out of which all manageent expenses of the Association shall be paid. This und shall be maintained by crediting thereto 15% f the total collections for assessments and dues of ach division, plus the cost of medical examinations nd allowances for the acquisition of new business, he latter item not to exceed the sum of seven ollars per thousand of insurance.

ARTICLE X—SECTION 5

PRESENT

Sec. 5. Any Officer, or member of the Executive or Auditing Committees, or any Agent or his epresentative attending any annual or special meetng of the members, shall be entitled to reimburseent of necessary traveling and hotel expenses inurred by reason of such attendance.

PROPOSED

Omit the word "Agent" and substitute the word Collector."

ARTICLE XI—PARAGRAPH 11

Order of Business

The order of business at all meetings of the Asociation shall be as follows:

1—Appointment by the President of a Committee n Credentials.

2—Nomination and election of Secretary of the neeting.

3—Report of Committee on Credentials and ction thereon.

4—Minutes of last annual meeting and action hereon.

5—Report of the President and action thereon.

6—Report of the Secretary and action thereon.

7—Report of the Treasurer and action thereon.

8—Report of the Auditing Committee and action hereon.

9—Report of committees appointed at last annual meeting and action thereon.

10—Report of the Secretary on proposals to amend the Constitution and action thereon.

11—Authorization of expenses for ensuing year.

12—Report of committee appointed during the meeting and action thereon.

13—New business.

14—Election of officers.

PROPOSED

Omit the following: 11—Authorization of expenses for ensuing year.

N. M. GIFFEN,
Secretary.

ASSESSMENT Nos. 830-831-832 and 833 have been levied by the Telegraph and Telephone Life Insurance Association, New York, to meet the claims arising from the deaths of Robert F. Stewart, aged sixty years, New York; James M. Stevens, seventy-five years, Atlanta, Ga; John Wintrup, eighty-two, Philadelphia, and Chas. J. Lippman, seventy, Philadelphia.

The Business Well Maintained

THE twenty-fourth ordinary general meeting of the Marconi International Marine Communication Company, Ltd., was held on July 30th at the Connaught Rooms, Great Queenstreet, W. C., Senatore Guglielmo Marconi, G. C. V. O., LL.D.D. Sc. (the Chairman of the company), presiding.

The Secretary (Mr. A. Ogle, M. C., A. C. I. S.) read the notice convening the meeting and the report of the auditors.

The Chairman, in moving the adoption of the report and accounts, said that shareholders would have learned from the report of the exceptional circumstances which had adversely affected last year's working. With regard to the profit and loss account, the amount of £976,138, representing ships' telegrams, contracts, rentals and sundry receipts, showed what would appear to be a very substantial reduction of some £127,832. The Board had on previous occasions informed shareholders that the rate of pay of operators varied from time to time consistently with changes in other seafaring ratings decided by the Shipping Federation. In 1922 those ratings were substantially higher than they were in 1923. The amounts the company received from shipowners in payment of operators services varied accordingly, and in consequence of the lower rate of pay ruling in 1923 the company's gross revenue showed the substantial reduction indicated by the figures. The variation however, should not have any material effect upon the profits of the company, as they looked to receive from shipowners only an amount which should cover the disbursement the company made. They did not aim at securing any benefit for the work which they did in that direction; their profit came from contracts for rentals, maintenance and telegrams. That figure was substantially the same in 1923 as in 1922.

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The number of ships fitted with their system at the end of 1923 remained approximately the same as at the end of 1922. The substantial reduction in profit had arisen, not in consequence of reduced business, but from exceptional causes which the Board trusted, for the most part, would not be repeated. It was a matter of no small satisfaction that the volume of their business had been maintained, notwithstanding the continued depression in trade, from which shipowners were perhaps among the severest sufferers.

In the report were set out very fully the causes of the heavy loss of approximately £35,000 which the company had incurred during the year in consequence of the payments for operators' services received from shipowners being less by that amount than the sum which the company had paid out. The directors were devoting their attention to such a change of system as would relieve the company of that heavy burden.

Having regard to the exceptional nature of the losses incurred during the last year, and to the fact that the company's business had been well maintained, the Board had felt justified in recommending a final dividend of 5 per cent., making a total distribution of 10 per cent for the year. There were other reasons which the Board thought justified them in recommending that distribution. Notwithstanding the large number of ships which still remained out of commission, and the depression generally which prevailed in the shipping trade, the company's direction finder business was showing very satisfactory extension. Substantial orders had been received for it during the year. Past experience had also clearly demonstrated the great need for lifeboat equipments, and the development of this business was also promising. The company was also experiencing an increased demand for installations for trawlers.

With the erection of long-distance broadcasting stations both at home and abroad there was further a better prospect of business at sea. The difficulties which had hitherto prevailed in consequence of the interference from coast stations would no longer operate. There was prospect of yet another source of revenue, not without importance to the company, which would be derived from a new patented apparatus which had emanated from the parent company. He hoped to be able to speak more freely and with greater interest on that subject when he next had the pleasure of meeting the shareholders. While they had to be satisfied with a somewhat smaller dividend this year than was distributed during the preceding year, the Board were gratified to know that the business of the company rested on a solid foundation. The development of the direction-finder had greatly reduced the danger from fog at sea, which was one of the greatest terrors of a seaman's life, and in all other respects the company had continued to render inestimable services to ships on every ocean.

Godfrey C. Isaacs, Deputy-Chairman and managing director seconded the resolution, and it was carried unanimously.

Swedish Railways Changing Motive Power

A DESIRE to utilize the country's abundant supply of "white coal," and keen competition of automobiles on the short-haul passenger and freight traffic are two reasons for the increasing use of gasoline motors and the electrification of the Swedish railway system, according to a report to the Department of Commerce from Commercial Attache, Sorenson, Copenhagen. The "white coal" supply is preferred to fuel which can only be imported at great cost and is changing the great trunk lines of Sweden from steam railways to electric lines; while the result of the automobile competition has caused increased use of gasoline motors, particularly Diesel motors, and the shorter local passenger lines, mostly privately-owned, are now rapidly being transformed into a motorized train service.

The first Diesel motorized train was installed in September, 1913. At the present time there are about 15 of these trains in operation on the Swedish lines. From five to ten cars are now under construction, and plans are under way for an increase in the number of motorized trains—some for lines partly motorized others for lines now using steam power exclusively.

The motor train is far more economical to operate on short lines, since only one operator is required; it also permits better service than a steam train. The Diesel operated trains have even competed successfully with both passenger bus lines and motor truck freight service in various sections of the country, and have apparently become an established part of the Swedish transportation system. It is thought that motor-train service will gradually displace the steam-driven train on the short or feeder lines, in the same measure as electric power is rapidly displacing steam on the trunk lines.

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CONTENTS

Toward the Electrical Age..... 388

KDKA'S Signals Have World Wide Range..... 390

The Regenerative Receivers. By M. C. Batsel. The Kolster Radio Compass. 391

Quadruplex Faults and Disturbances..... 392

The Cyrus Field. Automatic Telephony..... 393

Railway and Commercial Telegraph Institute. American Engineering Standards Committee..... 394

First Radio World's Fair Attracting the Attention of International Financiers..... 395

Wheatstone Bridge..... 396

Marconi Contract with the Post Office. The Imperial Wireless Scheme..... 397

Government Competitive Cables..... 398

Progress of the Telephone and Telegraph Systems. Back to Nature Via the Automobile..... 399

Editorial Comment—England will never be conquered by Babbitt. Telephones in Lithuania..... 400

The Railroad-Telegraph and Telephone Section of the American Railway Association..... 403

Radio Corporation of America. Telegraphy and Telephony with Railroad Applications..... 404

Personal. Postal Telegraph-Cable Company. Obituary..... 406

Western Union Telegraph Company. A Dollar's Worth for the Tax Dollar. Telegraph Statistics..... 407

All America Cables. Secretary Hoover Calls Third National Radio Conference. Many States Benefit by Zoning Legislation..... 408

Hudson Bay Company Installs Radio Sets in Outposts. Acme Commodity and Phrase Code..... 409

Automatic Telephone Systems. Electrical Measuring Instruments..... 410

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Towards the Electrical Age

The Failure of Private Enterprise in England.

The World Power Conference at Wembley has had the advantage of staging for us, in a big way, a central problem of our national development. The growth of human civilization has always marched in step with advances in man's utilization of power. When the cave-men of the old stone age made their big leap forward into the archaic culture, it was largely because they learned, for purposes of transport and agriculture, to employ domestic animals. The industrial age, with its mingled potentialities of cruelty and wealth, began with the utilization of steam. We are passing now into the electrical age. The new power differs from the old, not merely by its physical properties, but also by its social implications. The steam-engine called for no elaborate organization of cooperation. It could come to its own in an age of individualism and *laissez faire*. Electricity, for its full development, calls for the joint action of great social forces. It began on the scale of municipal trading. We must presently extend it, with much vaster provincial areas for its unit. Even the possibility of international trading in it is seriously discussed, for Norway is offering to export her surplus power to Denmark, and there are enthusiasts who suggest that she might actually supply current to us across the North Sea. When steam power first brought destruction to our traditional home industries, enslaved the children of Lancashire and ruined the weaver's home, it was for two generations the unmitigated curse of the working-class. The new power develops its possibilities in wholly different conditions. The organization of the workers is strong enough to use it, and enlightened enough to see its inevitable tendencies. As the yoked oxen of early civilization made the peasant farm, as the steam-engine made the factory of capitalists enterprise, so does this new force, with its vast range of action, drive as naturally towards co-operation and public enterprise. It is, as Lenin, with his gigantic schemes for electrifying Russia, foretold, in his last active years, the natural ally of Socialism. The pace of our advance to our political goal may depend on the quickness of our imaginations in seizing its possibilities.

The first step towards realizing the benefits of the new power, is to grasp the danger of our backwardness as a nation. We were the first to develop all the uses and powers of steam. Our coalfields were active on a great scale long before those of the Continent: the first inventions were ours, and we profited in exploiting them by our immunity from invasion, while the Continent lay in the long agony of the Napoleonic wars. It has been otherwise with electricity. In its utilization we are falling perilously behind our competitors. The following table shows in kilowatt hours the quantity of electric energy produced each year for each inhabitant of the various countries:—

Switzerland	700
Canada	612
Norway	493
United States of America	472
Sweden	364
France	147
United Kingdom	139

The case is rather worse than this table suggests, for our progress is almost stagnant. In the United States the average annual growth in the production of electric energy, has been, for the past fifteen years, at the rate 25 kwt per inhabitant: in Great Britain, in the same period, the growth has been only at the rate of 3.7 kwt. The entire electrical production of these islands, with their 45 millions of inhabitants, is less today than that of the metropolitan district of New York, with its seven millions.

The American contrast is worth pursuing. A first glance at the table suggests the reflection that our backwardness in comparison with Switzerland and Norway is hardly a matter for surprise: they have no coal, and we lack their facilities for the use of waterpower. But the chief American cities are in the same case as ourselves. New York and Chicago use no water-power, and depend on coal for the generation of their electricity. Even more remarkable than the scale on which they use it, is the cheapness of the current they enjoy. Their coal is somewhat dearer, for their $5 quality is about equal to our 20s. coal. Wages and other costs are much higher in the United States, yet the current is sold at about half the British price. The average price of current for light, power and heat, sold by the Charing Cross, Chelsea, Kensington, Metropolitan, and Notting Hill companies, was 5.05d. per unit (*Electrical Times*, February 7). In Chicago the average price in 1921 was 5.41 cents, which means 2.7d. at par. I am indebted to a leading American engineer for some further figures. The Chicago Commonwealth Electric Company sells lighting current at an average of 6.11 cents. per unit (3.03d.). The London Electric Supply Corporation has a sliding scale tariff varying from 8d. to 6d. The Chicago prices, however, are relatively high. The average American price for electric energy is under 2.25 cents, or about 1.1d.

The reason for this startling difference in price of current is not mysterious. Our electrical development has been arrested at the stage of small scale production. An inordinate number of small concerns, some private and some municipal, serve our needs, a system which is excessively expensive, both in first cost and in operation. Their distributing networks are, moreover, fed and organized on varying plans, so that they cannot at need help each other. Small generating units, besides being more costly to install, are far less efficient, because they consume more fuel to each unit of electricity produced, and also because they require a greater provision of reserve units. London, with its 77 central stations, was consuming (in 1921 when the Engi-

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eering Committee of the L.C.C. reported), on an erage, 3.7lb. of coal to produce one kwt. of elec-icity. The American consumption, based on the erage of four important power stations, is only 871b. With a system as efficient as that of the nited States, we might save over the whole coun-y over two million tons of coal for export. The ntrast between the two methods is best illustrated the example of Chicago. Its 2,700,000 inhabit-nts are served by a single company, from three ntral stations, where London, with about twice e population has 77. But the tendency to an eco-omical concentration is universal. Paris was rved by 20 stations in 1907: in a very short time will have only six or seven, serving a much rger area.

The broad meaning of these comparative figures clear even to those of us who have no engineer-g knowledge. We are making in this country an adequate use of electricity, because an antiquated stem of supply charges us twice the reasonable rice. We are wasting coal by millions of tons very year. A resolute effort to provide, not London lone, but the whole country, with a modern sys-em of superpower stations would, in the first place, ring work and prosperity to the depressed trade of ngineering. It would next, as the work was com-leted, bring its stimulus of cheaper power to every ndustry in the country.

The advantages of electrification on suburban ailway systems, where traffic is visibly dense, are ow sufficiently familiar. But the ablest expert pinion is now convinced that the electrification of he main line system would actually be more profit-ble still. That is the conclusion which the lead-ng authority, Lt.-Col. H. E. O'Brien, defended in powerfully reasoned and very fully documented aper, which he presented last March to the In-titution of Electrical Engineers. The density of raffic on the main trunk routes, "in ton miles per rack mile per annum," is, he argues, "very much reater than on the electrified suburban lines." His inal conclusion is that, apart altogether from the levelopment of traffic which would follow from the etter service, "main line electrification is likely to e more profitable to the railway companies than urburban electrification," and he predicts a further et profit of 5 to 10 per cent. on the capital ex-ended on electrification.

It is impossible in a single article even to glance t all the possibilities. English experts have hither-o been sceptical over the possibility of bringing lectricity to the service of the farm and the small olding. The cost of laying down the distributive etwork for scattered farms in a thinly-peopled rea would, they say, be prohibitive. They tell us hat the suggestions on this subject in the I. L. P.'s eport on agricultural policy ignore that technical difficulty. The answer is simple and sufficient. What we proposed as an ideal for England is al-ready a reality over wide Continental areas. In Southern Germany there are now wide stretches of the countryside where the whole mechanical work of the farm is done by electric power. Farmers, villagers, smiths and wheelwrights formed themselves into cooperative societies, which laid down their own distributing network and usually bought their current from a central station. Of these societies no less than 2,970 had been formed by the end of 1920. But even our experts know too little of the romance of recent electrical developments on the Continent. We have all heard of the plans for a canal connecting the Rhine with the Danube. But it is fascinating to learn that the cost of building it will be covered by the sale of the electric power generated by the fall of the water from one level to another in the canal.

A Socialist Party cannot be content to allow electrical developments to struggle along without direction. Private enterprise in this country has proved itself backward and inefficient. It is wasting our resources. It is not meeting our needs. It is not even creating the demand which its own profitable working requires. There is no task before a Labor Government so inviting as this. It will have a hard battle to secure the necessary compulsory powers for the amalgamation of authorities which must precede the creation of super-power stations. If it cannot persuade the railways to do with their main trunk lines what even the backward French lines are already doing, it is clear that it must boldly propose to take them over and nationalize them. The first step is to create a general staff, political as well as technical, for the planning of a comprehensive scheme. We have our general case for bold action in the perilous backwardness of this country as compared with its chief trade rivals. Against the obstruction of the interested, Labor can set the benefit to all the industries of the country. It can promise boons to housewife and farmer, to townsman and countryman alike. If we delay, there is the danger that electricity like steam may become the instrument of exploitation. If it hastens, it can link the friendly force of the future with the realization of our own ideals.

New Edition of Beginner's Manual of Submarine Cable Testing and Working, by G. M.

Beginner's Manual of Submarine Cable Testing and Working, by G. M. Baines, has been thoroughly revised by its author and it was issued in fourth edition form on June 1, 1921. The book is primarily for students in submarine telegraphy. All of the subjects on submarine telegraphy demanding attention have been brought within the scope of this volume, and have been dealt with, if not exhaustively at least at sufficient length to enable an intelligible idea to be obtained of them, which will admit of wider extension later. The book measures 5½ inches wide by 8½ inches long and contains 174 pages fully illustrated. The price of the work is $4.50 per copy, and it may be obtained at the office of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.—Advertisement.

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KDKA'S Signals Have World Wide Range

RECOGNIZING the fact that the short wave signals transmitted from KDKA, world's pioneer broadcasting station have a world-wide range and offer the only solution to dependable voice communication at immense distances, the steamship "Arctic" sailed recently from Quebec on a voyage to Etah, Greenland, carrying a full complement of special radio equipment suitable to pick up special broadcasts from KDKA.

The "Arctic" is carrying with it two Canadian Westinghouse special receivers, one of which is for delivery to Donald Mix, radio operator of the McMillan Expedition, somewhere along the Greenland coast, the other set is for use aboard the "Arctic." Both these sets are designed to receive special signals which will be transmitted from the new experimental station of the Westinghouse Electric and Manufacturing Company, at East Pittsburgh, Pa., every Monday night from 10:30 to 11:00 Eastern Standard Time.

In addition to its receiving equipment the "Arctic" is equipped with three transmitting sets, one standard ½ Kw., 600 meter spark set; one 1 Kw., 2100 meter ICW set; one 2 Kw., 120 meter ICW set.

The call letters of the "Arctic" are "VIM" and it will operate on a wavelength of 120 meters.

No more complete plans for carrying on a constant communication with the outside world were ever made by an Arctic expedition, particularly with respect to communication with the "Bowdoin," McMillan's ship, from which little has been heard in months.

Through the efforts of Commander C. P. Edwards in charge of the Radiotelegraph Branch of the Dominion of Canada, a complete schedule of transmission has been arranged. Communication for the "Arctic" from the Dominion officials and from the wives of the officers of the "Arctic" and the parents of the two radio operators on board, will be sent to KDKA for transmission.

KDKA will transmit every Monday night on predetermined wavelengths. Thus when the "Arctic" arrives at the coast of Greenland she will have been in constant communication with the East Pittsburgh station. It is expected that when the ship reaches Greenland she will be able to get in touch with Donald Mix, radio operator with the McMillan expedition, either on his 2100 ICW set or on his 600 meter spark set. Then "KDKA's" signals can be relayed from the "Arctic" to the "Bowdoin." It is expected that the two boats will be able to carry on in this manner until the special set can be delivered to the "Bowdoin," after which "KDKA" will transmit direct both on CW and on voice to the McMillan ship.

To insure that communication from the "Arctic" may be received in civilization, it has been arranged to equip two of the Hudson Bay Company boats, the "Bayeskime" and the "Nascopie" with Canadian Westinghouse special receivers, designed not only to pick up "KDKA's" special wave but also the signals from the "Arctic." It is hoped by this means to relay messages from the "Arctic" through the Hudson Bay Company's boats to the Labrador Coast stations and then on the G. A. Wendt of the Canadian Westinghouse Company at Montreal or straight through to KDKA. It is anticipated that the "Arctic," through its transmitting equipment will be able to keep in communication with KDKA, although it is quite possible that the ship's signals will be lost. However, KDKA will continue to send whether or not, any acknowledgement gets through from the "Arctic."

While the working schedule of the traffic from KDKA has been arranged for every Monday night in the event that the necessities for additional communication arises, this schedule will probably be increased.

The "Arctic" is in charge of Capt. J. W. Bernier, Canada's veteran Arctic Explorer. Captain Bernier, though seventy-two years of age is one of the most active men aboard ship and when going through the ice peaks he directs the operation of the ship from the crow's nest, which is 92 feet above the deck level. Last year he met McMillan at Etah and dined aboard the boat with him. Because he is going by way of Cumberland Gulf this year, instead of sailing direct up the Greenland Coast, it is anticipated that he will not be in touch with McMillan until sometime in August.

Captain Bernier has a record of more than 20 years as an explorer. He has known personally all the notable explorers of the world including Perry, Amundsen, Steffansen, Nansen and others.

The Radio operators on board with Capt. Bernier are Chief Operator William Choat and Assistant Operator J. Finnie. Mr. Choat is one of the best known radio amateurs in the Dominion of Canada and was entrusted with the mission of carrying on the "Arctic's" communication because of his long service with the amateurs.

The "Arctic" is a three-masted schooner with an auxiliary steam engine. The front and rear masts are 60 feet high and the center mast 92 feet high. The boat was designed particularly for polar expeditions. The sides are 36 inches thick, consisting of an outer layer of 12 inch pitched pine, the second layer of 12 inch green heart and an inner layer of 12 inch oak. Between the various layers are six inches of heat insulating material. Between the decks there is about six inches of cork insulation to prevent heat radiating from the boat.

In addition to the Canadian Westinghouse Company's short wave set, the "Arctic" is carrying a large amount of mail for McMillan with special letters from the officials of the Canadian Westinghouse Company and the Westinghouse Electric and Manufacturing Company which will give Operator Mix full instructions regarding short wave reception.

Last winter, amateurs and some broadcasting stations reported communication with the McMillan expedition, but communication in the summer is more difficult. The special sets will no doubt end this condition. Just a few weeks ago, the waves of KDKA were received plainly in Argentine, in day-

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ght, a record of voice transmission that has never een approached, so there is no doubt of their ability reach through the Arctic Circle.

The Regenerative Receiver

By M. C. Batsel, *Radio Engineer Vestinghouse Electric and Manufacturing Company.*

There has been considerable written recently in egard to interference caused by receiving outfits. s a result of this discussion the radio public may e confused in regard to the real situation, its auses and possible means of improving conditions.

We are sure that legislation making it illegal to perate a receiver that can radiate, if it is improperly perated will not prevent the use of such receivers. he following facts have led us to this conclusion.

1. There are many more receivers in use in the Jnited States that were constructed by the users r some one in the users locality, than there are of hose manufactured by recognized manufacturers. he apparatus is frequently changed and experinented with so that there can be no check upon its bility to interfere with other receivers in the vinity where it is located.

2. The cheapest and most efficient receiver that an be made is of the generative type so that the erson of limited means desiring to listen to the roadcasted entertainment can obtain more for his xpenditure of money if he choses a regenerative set. his is true whether he constructs his own outfit or uys a manufactured set. The maintenance cost f the regenerative receiver is small. The receiver hen properly operated will not interfere with other eceivers nearby.

3. Simple inexpensive regenerative receivers will perate efficiently on small indoor aerials.

4. In England the manufacturers of receivers or listening to the broadcast programs were reuired to obtain approval of the British Post Office uthorities on all types of apparatus before it was ffered for sale. One requirement was that the aparatus should not be capable of producing interference with other receivers. Notwithstanding hese regulations, the interference from receiving pparatus has not been eliminated according to the Wireless World," a Radio Magazine devoted to he interest of radio development in Great Britain, he British Post Office no longer requires that the pparatus be incapable of radiating. This magazine oints out that it is very difficult to construct effiient inexpensive receivers that are not capable of adiating if they are improperly operated and voices he opinion that the way out of the troubles in Great Britain is through education of users of receiving pparatus rather than by limiting the enjoyment of he broadcasted programs to those people who can fford to purchase expensive apparatus and pay arge maintenance costs.

5. It is not difficult for the user of a regenerative receiver to know that his receiver may be nterfering with reception by other people. When the regenerative amplification is increased to more than the useful amount the operator hears a squeal in his own receiver and should immediately reduce the regeneration or amplification until the squeal stops.

If every operator of a regenerative receiver who desires to enjoy the broadcast transmission realizes that every time he permits his receiver to squeal that his neighbors who may be listening to the same station must endure listening to the same squeal, we are sure that there will be little trouble from careless handling of regenerative receivers.

Should the education of users of regenerative receivers fail to produce results then it will be necessary for manufacturers and dealers to discourage the manufacture and sale of all apparatus capable of producing interference and to discourage the use of such receivers, thereby denying the public the privilege of obtaining the cheapest and most simple efficient apparatus now known for receiving. It would be practically impossible to enforce a law prohibiting the use of radiating receivers because of the home made apparatus and the experimenters. It is possible for those who can or care to pay for them, to obtain efficient receivers that are not capable of causing interference. These receivers may be operated without taking precautions of any kind and besides usually have other desirable features such as the ability to tune out local stations and listen to distant stations.

In closing, let me emphasize again that if every operator of a receiver that can be made to squeal when the tickler or regeneration is increased too much, will immediately reduce the regeneration until the squeal stops, then there will be no need to look upon the simple regenerative receiver with disfavor.

Kolster Radio Compass

The Kolster Radio Compass is to be immediately installed on board the steamships "YALE" and "HARVARD," plying between San Francisco, Los Angeles and San Diego, purchase contracts having been closed between the Los Angeles Steamship Company and the Federal Telegraph Company, sole owners and manufacturers of the compass.

This is considered a wise and far-seeing move on the part of the Los Angeles Steamship Company, as the Kolster Radio Compass insures their ships against disaster and the consequent loss of life and property. The ships will be able to determine their exact position in the densest fog. Passengers may sleep, eat and enjoy themselves generally to their heart's content, no matter how black the night, how dense the fog, or how threatening the weather.

The Kolster Radio Compass is considered by authorities and students of maritime affairs to be the greatest of modern inventions for the protection of lives and property at sea. It is also a great aid to ordinary navigation. It was invented and developed by Dr. Frederick A. Kolster of Washington, D. C. and San Francisco.

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Quadruplex Faults And Disturbances.

ONE of the most perplexing problems met with by newly assigned chiefs and those detailed to oversee and care for quadruplex apparatus is how to determine and locate a fault.

To do so quickly with any degree of certainty necessitates not only a thorough knowledge of both the mechanical construction and the theory of the apparatus, but careful and persistent observation of each "symptom," as the various disturbances appear from time to time.

Nevertheless, one must not be discouraged should the task of locating the cause of the trouble by one or more of the indications prove erroneous. The most experienced experts are frequently compelled to make several tests before finally arriving at an accurate conclusion on account of the similarity of certain indications accompanying faults of a widely different character. But as a rule the most frequently occurring disturbances can be readily determined with a reasonable degree of certainty, after a comparatively short experience, if one will but take the trouble to learn the significance of the ever-present guides, the following of which are mostly trustworthy.

WIRE FAULTS

If, while manipulating the key on the number one side of the desk, the polar relay records the signals promptly and distinctly, even though you should get the "back stroke," and the removal or insertion of plugs in the rheostat has no disturbing effect thereupon, it is certain that the line wire is open.

Should the signals be broken, however, or otherwise interfered with by the process, it will denote that the wire is closed, but probably crossed or grounded at some point. If it is simply grounded, the centering of the armature of the polar relay may be easily effected when the lever of the home switch is turned to "earth." The condition would then be the same as if the distant office had turned his switch to "ground."

Should the lever persist in clinging strongly to one pole of the magnet, under the above condition, it will denote the presence of a current of electricity —probably from a foreign circuit with which the wire is crossed. Of course it is possible that the current you get may be legitimate, and the distant station, through defective or improper adjustment of the apparatus, may be unable to make you hear him, but where you have completely "lost" the office at the other end of the circuit it is safe to attribute the current to a cross.

To determine which side of a repeating station the wire fails, it is only necessary to listen to the signals produced on the home relay by manipulating the key. If the fault is beyond the repeating station, the signals will be recorded on the home relay and sounder a fraction of a second after the key makes contact.

DEFECTIVE APPARATUS

It sometimes happens that while the wire quadruplexes easily at one end the distant office fails to get four corners out of his apparatus. It is here that the skill of a chief operator is severely tested, and where an opportunity is presented for him to help out of a difficulty an inexperienced quadruplex attendant at a repeating station.

EFFECT PRODUCED BY AN IMPROPERLY ADJUSTED POLECHANGER

Let us assume for the purpose of illustration that the wire and the apparatus at the other end of the circuit are all right, but still that office is unable to read our signals clearly on one or perhaps both of his relays. We will also assume that our apparatus is of the generator arrangement, and that the trouble is in the home set.

The method would be to first ask the distant office to state the nature of the fault, in order that the search may be in the right direction. If he says that the signals are distinct on his common side, only when the home polar side is quiet, it is more than likely that the home polechanger is improperly adjusted. After we have cleaned and adjusted the points as closely as possible, without giving it a tendency to spark, ask the distant office to "ground" and to listen to his own neutral relay, while we manipulate our polechanger and while our full battery is going to the line; that is, with the transmitter closed. If the distant point hears no click on his neutral relay, under these conditions, the fault will have been eliminated.

EFFECTS PRODUCED BY IMPROPERLY ADJUSTED TRANSMITTER POINTS

It frequently occurs that the distant station cannot hear the home signals on his neutral relay. When we are so notified, we should immediately examine the tongue of the transmitter as well as the wire attached to the "leak-box." In nearly every case the trouble will be found at one of these points. Perhaps the adjustment of the contact points is such as to prevent the tongue from being pulled away from the upper post when the transmitter is closed, thereby making no connection with the "leak." Under these conditions the home battery would continue to go to the line via the upper post of the transmitter, regardless of its position, and the neutral relay at the other end of the wire would, therefore, remain closed.

For a similar reason the distant neutral relay would remain open, irrespective of the position of the home transmitter, should the tongue of the latter cling to the lower contact point. In the latter disarrangement of the device the 900 ohms leak would always be connected, and, consequently, the home electromotive force would be reduced to the strength of a "short end" only.

Should the wire attached to the "leak" become broken or disconnected, the neutral relay at the distant station would likewise remain closed, regardless of the position of the home transmitter, because the short route which reduces the home electromotive force is now unavailable.

Again, we will suppose that the station in difficulty informs us that notwithstanding the fact that his balance is apparently all right, still, upon at-

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tempting to work the apparatus, he finds that both of his relays are more or less interfered with by his own battery.

One pole of his battery may cause the incoming signals to be either light or heavy, as the case may be, while the other pole may have just an opposite effect, possibly shutting out altogether the incoming signals.

DEFECTIVE COMPENSATING GROUND COIL

We should immediately suspect our own ground coil as the cause of the trouble. It would be quite evident that the apparatus at the other end of the wire was out of balance, and it would follow that the abnormal resistance to which the rheostat had been adjusted while the home station was on "ground" had disappeared the moment the home station cut in the battery.

The explanation is that an open "ground coil" would compel the incoming current to find a ground through the home rheostat or the leak-coil, which contains a much greater resistance than the proper compensating coil. The distant balance would therefore be false, because, after the home station had "cut in," the actual resistance of the circuit would be much less than that in the artificial line.

A loose connection of the wire connected to a ground coil, or an ink-covered disk, might add hundreds of ohms resistance to the compensating coil, and thus destroy its usefulness. If the fault can not be quickly repaired, the distant station should adjust the rheostat to the incoming signals on the neutral relay while we "dot" or "write" for him on our transmitter after the method of balancing previously described.

BATTERY AND OTHER FAULTS

When the distant office, after taking a balance, informs us that he can hear our signals on his neutral relay only when the key on the home polar side is closed (or open, as the case may be), it is possible that one pole of the home battery is open, or at least the current is not passing through the polechanger.

The quickest way to verify this would be to push the home switch-button just close enough to the "ground" disk so that the point of a lead pencil would make contact between them. Then by alternately opening and closing the home key controlling the home polechanger and while inserting the point of the pencil between the intervening space, a current of electricity would cause a spark to appear directly contact was made. The absence of the spark would show that none of the current reached that point; while the position of the lever of the polechanger would indicate which pole of the battery was missing.

Should it be impossible to restore the battery at once, it will still be possible to get a duplex out of the quadruplex apparatus, by so setting the key on the polar side that the bar lever of the polechanger will rest upon the "good" pole of the battery, and then utilizing the common or neutral side as a duplex.

Do not attempt to transmit on one side of the quadruplex and receive on the other side, as inexperienced operators have frequently attempted to do, because the apparatus will not work. You will simply impair both sides by the operation.

The Cyrus Field

THE new twin-screw oil-burning cable ship *Cyrus Field,* which has been built for the Western Union Telegraph Company by the Société Anonyme des Chantiers et Ateliers de St. Nazaire, France, was on view on August 8th, at the West India Dock. The equipment includes a combined picking-up and paying-out plant, supplied by the Telegraph Construction and Maintenance Company, London, England, radio direction-finding apparatus, Sperry gyro-compass, and an electric log. The vessel, which will be permanently stationed at Halifax, Nova Scotia, will be employed in that area to maintain the network of cables of the Western Union Atlantic system, but will at the outset be utilized for work off the coast of Great Britain. It is understood that the tender of the French firm was much below that of British and of other Continental shipbuilders.

Automatic Telephony

H. H. HARRISON, author of the book known as "Printing Telegraph Systems and Mechanisms," is out with a new book entitled "Automatic Telephony" with emphasis on the Strowger System. We hope that Mr. Harrison's new book will be received with the same graciousness as his Printing Telegraph Systems and Mechanisms. The price of this work is $2.50 per copy. It contains 146 pages of reading matter and 161 diagrams. It measures 5¾ inches wide by 8¾ inches in length. The preface is worth repeating here. It says: "This book has been primarily designed as a text-book for class instruction on the subject of Automatic Telephony.

Although it deals exclusively with the Strowger System, the author does not feel that this limits its usefulness, since, with the exception of one method of automatic switching, the fundamentals of the art may be grasped by a study of the details of any one of the automatic systems.

Further, the treatment of only one system of automatic operation carries with it the advantages that the book becomes reasonable in size and price, while the description given can be adequate.

It is felt that no apology need be made for selecting the system which has been adopted for London.

The general arrangement of the book is such that, it is thought, the subject-matter can be conveniently divided up for instructional purposes.

The mechanisms have been fully illustrated, so that the subject can be intelligently followed by the private student who is so placed that he has not ready access to the switches.

Copies may be obtained by addressing Telegraph and Telephone Age, 253 Broadway, New York.

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Railway and Commercial Telegraph Institute

EDWIN G. ZACHOW, for twenty-two years identified with the Western Union Telegraph Company at Milwaukee, Wis., recently resigned, and has purchased the entire stock, fixtures and rights of the Railway and Commercial Telegraph Institute, University Building, from Jesse E. Matteson, who retired so that he could devote his entire time to several patents, which have recently been favorably acted upon at Washington.

For the past five years Mr. Zachow has also been an instructor of an evening class in telegraphy at the Federal Railway Institute, and for the past twenty-two years has been in the capacity as branch manager and telegrapher for the Western Union Telegraph Company. For eleven years he had charge of the Western Union Office in the Mayer Building, handling all the wholesale, commission and brokerage business. It was through his efforts that this branch office was equipped with a direct New York and Chicago wire, besides his locals. He has also had railway experience.

At the age of thirteen years, Mr. Zachow left his home at Neenah, Wis., where he was born in 1884, to become messenger for his brother, who was manager at that time for the Postal Telegraph-Cable Company at Janesville, Wis. He studied telegraphy, nights, from eight to twelve each evening, and at the age of fourteen was made manager of the Postal Telegraph-Cable Company at Stoughton, Wis. It was said at that time that he was the youngest manager in the service. He was later transferred to be relief manager and operator at Kenosha, Neenah, Menasha, Appleton and Green Bay. From there he went to the Chicago and Northwestern Railway, calling a party on his bluff, who told him that he could never work a railroad trick. Mr. Zachow took his examination at 2 P. M., the following day, and at 4.40 P. M., he was on his way to the doctor for his physical examination at Oshkosh and the next evening was holding one of the heaviest positions on the division at North Fond du Lac. All trains were made up at this division point and got their running orders through Mr. Zachow.

On May 11th, 1903, he went to Milwaukee to visit his brother, and was offered a position in the local Western Union office. He accepted and has been there ever since. For the past five years he has handled a Board of Trade wire for the Western Union Telegraph Company.

Mr. Zachow not only intends to run morning, afternoon and evening classes in telegraphy, five days a week, but it is said negotiations are now under way to incorporate for $10,000, and classes of stenography and traffic manager will be included, as soon as the improvements and arrangements now underway have been completed.

It is said the Institute, when incorporated, will be one of the greatest of its kind. An operator and stenographic bureau will be installed later and any operator or stenographer out of employment will be able to apply for a position. If he or she passes an examination, a position will be found for them somewhere. Successful students will be sent all over the United States to work for the different railroads and commercial companies. Students from all over the United States will be solicited to attend this Institute.

No exact date has been set for opening the Institute, but applications are now being accepted and places reserved. Out of town students will be assisted in finding employment, half day or evenings, to help pay their expenses; also suitable places to room.

There will be three classes daily, except Saturday and Sunday, when the Institute will be closed.

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American Engineering Standards Committee

THE American Engineering Standards Committee has issued its report in book form. The book measures 8 inches in width by 10½ inches in length and contains sixty-four pages of valuable engineering matter of great importance to the trade. The American Engineering Standards Committee is the national clearing house for industrial standardization—a federation of the principal national organization and governmental departments that are active in such work. It serves as the official channel of cooperation in international standardization activities, and it serves as a bureau of information on standardization activities both in this country and abroad.

Through its methods and procedure all organizations concerned participate in deciding whether a given piece of work shall be undertaken, in developing the standard, and in recommending its approval. In this way the results of the work of hundreds of bodies is being broadened and unified into a truly national system of standards.

There now exists the most widespread interest and activity in industrial standardization that there has ever been. The Great War and the reconstruction problems arising from it have given an enormous impetus to the movement.

The work of the committee is indicative of the growth of the movement as a whole. One hundred and fifty-two projects have been completed, or are under way, and in these various projects two hundred and thirty-five national organizations, technical, industrial, governmental, are officially cooperating through accredited representatives. The number of the individuals serving under various sectional committees of the different projects is nearly 1100.

Of the projects which have reached an official status, 31 have to do with civil engineering and the building trades; 25 with mechanical engineering; 15 with electrical engineering; 4 with automotive subjects; 11 with transport; one with ships and their machinery; 14 with ferrous metals; 15 with non-ferrous metals; 12 with chemical subjects; 2 with

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textiles; 5 with mining; 5 with the wood industry; 1 with the paper and pulp industry; and 11 projects with topics of a miscellaneous or general character.

Not only does the work extend into more and more branches of industry, but the number of co-operating bodies necessarily increases with the number of projects. The co-operative relations with industrial and technical association, the federal and state governments, and foreign standardizing bodies continue to become closer and more important. It is universally recognized that standardization is a legitimate and constructive function of trade associations, and such organizations are steadily increasing their activities in this direction. Of the organizations officially co-operating in the work of the committee, over 140 may properly be classed as industrial or trade associations. Notable examples of the committee's co-operative work with the federal government are those in connection with the Federal Specifications Board, the Division of Simplified Practice of the Department of Commerce, and the new Dictionary of Specifications of the Department of Commerce. An important step in the development of international co-operation in standardization work was the Conference of the Secretaries of the national standardizing bodies held in Zurich, Switzerland, in July, 1923, at which the national bodies of thirteen countries were represented.

First Radio World's Fair Attracting the Attention of International Financiers

THE First Radio World's Fair to be held under the direction of Messrs. James F. Kerr and U. J. Herrmann in Madison Square Garden and the 69th Regiment Armory, New York City, September 22nd to 28th, is rapidly assuming an international importance which promises to make it an epochal event in the history of radio.

The coming Fair will not only be the largest and most complete show of its kind ever staged, but it will probably be the direct cause of quickly establishing the radio business on a financial basis similar to that now enjoyed by the automobile industry.

Over a dozen important European and American financiers will begin extensive surveys of the wireless field at the First Radio World's Fair and if they are duly impressed with the commercial possibilities of the new science—which seems a certainty—scores of able inventors and manufacturers who are now handicapped by a lack of capital will soon find themselves in a position to expand beyond their fondest dreams.

In an interview today one of Wall Street's best known bankers said:

"Now that Radio has reached the World's Fair stage, I am of the opinion that it will soon cease to be looked upon as a passing fad and eventually take its rightful place among the most important public service utilities of all countries.

"I am firmly convinced that Radio will in the very near future furnish cheaper light, heat and power as well as be the means of instantaneous trans-continental and trans-oceanic communication at a cost even lower than our present rate of postage.

"The leading capitalists here and abroad are already about half convinced that Radio really is a thing of tremendous commercial value and I think the coming International Exposition at Madison Square Garden will be an excellent closing argument for them. I fully expect to see several of our biggest railroad, steamship, electric, coal and oil magnates take an active interest in the development of Radio in all its branches during the coming year."

For the past two months a small army of scenic artists, carpenters and electricians have been at work on the booths and decorations for the big show. General Manager Kerr who is an exposition impressario of many years experience always insures against last minute delays through constructional mistakes by contracting for the delivery of all equipment two weeks before the opening date.

The Directors of the First Radio World's Fair, have made elaborate preparations for the convenience of Radio Jobbers and Dealers who are coming to the exposition in large numbers from all parts of the world.

A "Jobbers and Dealers Bureau" employing a special staff of registration and information experts have been established for the sole purpose of looking after the interest of the visiting wholesale buyers. The new department which is already in operation is making a tremendous hit with the radio trade as it will greatly expedite business transactions between manufacturers and merchants. By arranging interviews in advance through the Bureau it will be possible for one buyer to completely cover the huge exposition in five days.

In addition to making business appointments and furnishing advance information pertaining to the "offerings" of the various exhibitors and the "wants" of the wholesale buyers the "Jobbers and Dealers Bureau" will also act as a general information depot for all who attend the coming Fair. New York hotel accommodations can be booked through the Bureau which will also supply information regarding almost everything in the Metropolitan District to all who apply. There will be no charge for the service.

Two hours per day—from 11 A. M. to 1 P. M.—will be set aside for the exclusive transaction of business, between Exhibitors and Dealers. The Exposition will not be opened to the public until 1 P. M. each day.

A DIRECT telephone line from Pegu to Rangoon has recently been put into operation. The extension of the line to Mandalay (where the flying fishes play!) is under contemplation. This is in accordance with the policy of the Post and Telegraph Department of the Government of India in extending telephone trunk lines.

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Wheatstone Bridge

In tangent and differential galvanometers the effect upon the needle is proportioned to the strength of the current, this being controlled, of course, by the resistance in circuit. The Wheatstone Bridge system of measurement is entirely different, its action being based upon the fall of tension of the current.

The fall of tension of a current from the pole of the battery to the wire terminal at the ground is uniform. If, for a portion of the distance, we use two wires instead of one, the current will divide and flow by the two branches, and a point on one wire may be connected to a point on the other by a cross-wire, where the tension of the current is the same, without at all affecting the flow current on the two lines. For, as the flow of current is caused by a difference of tension between the battery and the point with which it is connected by the line-wire, and as the tension of the currents at the two points on the wires connected by the cross-wire rs the same, no current will flow through the cross-wire. And a galvanometer inserted in this cross-wire will, of course, show no deflection.

In Fig. 3, suppose the current to start from E and flow to post 1. Here it divides, one-half passing by wire A, 3, B, to 2, and the rest by C, 4, D, to 2, and thence the current returns to the battery. The

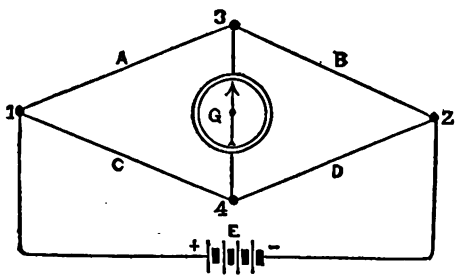

Fig. 3.

resistance of the sides, A and C, and B and D, being alike, the tension of the two portions of the current, at 3 and 4, is the same, and no current will pass across, from 3 to 4, through the galvanometer.

Again: suppose we insert at A a resistance of 10, at B 100, at C 500 and at D 5000. We shall find that the needle on the cross-wire still refuses to deflect. Because the current divides at 1, inversely as the resistance of the two routes 1, A, 3, and 1, C, 4; and the resistance at C being 50 times as great as at A, 50 parts of the current passed through A, with a resistance of 10, while 1 part passed through C with a resistance of 500. The tensions of the two portions, on arriving at 3 and 4, are the same, and as the same proportion as between A and C, is found between B and D, the divided portions pass on until they join at 2 and return to battery. Therefore, when A bears the same proportion to C, that B does to D, when A: C:: B: D, no current will pass between 3 and 4.

Now let us measure an unknown resistance which we will insert between the binding-posts at D. Say we put 20 ohms in at C, and 1 at A. The needle is deflected strongly. Now insert resistance at B until the needle comes back to zero. Say it requires 250 units.

Then,

$$\frac{20 \times 250 = 5000,}{1}$$

which is the resistance at D.

If the resistance to be measured is small, you may insert equal amounts at A and C, and then the number of units inserted at B will exactly equal D.

There are two forms of galvanometers in this country, made on the above principle: Siemen's and Gray & Barton's. The latter we will describe first, as its arrangement is similar to the diagram, Fig. 3.

The battery-wire is led to a brass plate, on each side of which are smaller plates connected with resistance coils. By inserting plugs on each side of the battery-plate, the proportions of resistance between the first and second sides of the bridge (A and C. Fig. 3) may be varied at pleasure. The resistance to be measured is introduced at D, and a rheostat box at B.

The Siemen's galvanometer is entirely different in appearance, and although not as accurate as the Gray & Barton for small measurements, is much more convenient for general linework, as it is portable, light and convenient in form.

The needle is made a static. That is, two light needles are affixed rigidly to the same shaft. The two needles are polarized in different directions. One being slightly stronger than the other, the working effect or polarity of the pair is the difference in strength between them. This being very slight, the tendency to remain in the magnetic meridian is very feeble, and an extremely weak battery-current will cause a deflection. To increase still more the sensitiveness of the needle, it is suspended by a single fibre of untwisted cocoon silk. The lower needle hangs inside the coil, while the upper, which serves also for an indicator, hangs across the top of the dial. The dial and needle are covered with a glass case: surrounding the base of the glass horizontally is a slate disc, divided into 300 degrees running 150 from each side of the centre or 0 mark. Half embedded in the edge of this slate is a platinum or german-silver wire. This wire forms the first and second sides of the Wheatstone bridge—the A and C of Fig. 3.

Pressing against this wire is a small platinum wheel with a vernier, on a movable arm. To this the battery-wire is connected. In the base of the instrument are three resistance-coils, 10, 100, and 1,000, either one of which is let into the third side (B, Fig. 3) by removing the plug which cuts it out. The resistance to be measured is introduced into side 4 (D, Fig. 3).

The principle of measurement is precisely like that shown in Fig. 3; but in the Siemen's, sides B and D being fixed, you vary the proportion between

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and C until the proportion of the latter two is ue same as the first two.

The slate being divided into two parts by the visions of 150 each, one side is marked A and the her B. To measure the resistance of a relay, for istance, we connect the battery to posts I. and II. id the wires from the resistance to be measured posts II. and IV. The plugs remain in, between II. and IV. Remove the plug at 100.

The current passes from post I. to roller Z. here it divides, one portion going by the wire on ie edge of the slate through the resistance coil 100 ack to battery, by post II. The other portion of ie current passes (on the B side of the slate) to osts III. and IV., thence out through the relay to e measured, and back to battery at post II.

Remember, that the wire between the roller Z nd 150, on one side of the slate, is the first side A, Fig. 3); that between the roller and 150 on the pposite side corresponds with the second side (C, Fig. 3); the resistance 100 to post II., the third side B, Fig. 3); and from post IV., through the relay o be measured, back to post II. (D, Fig. 3) is he fourth side; while from C, through the galvanometer, is the cross or bridge-wire.

Now, when by moving the roller Z to the left or ight, the proportion between the sides of the slate, A and B, is the same as between the resistance 100 nd the relay to be measured, the needle will come o zero.

Suppose that when the needle stands at 0, the wheel Z is at 50, on the A side of the slate. Then, s A is to B, so is 100 to X, the unknown resistance. There are 150 degrees on each half of the slate. Then the formula would read,

$$\frac{150 + 50}{150 - 50} \times 100 = X, \text{ or } \frac{200}{100} \times 100 = 200,$$

which is the resistance sought.

When a line is to be measured, connect battery o post I., ground to II., and line to IV. The ground on Post II. completes the circuits, as the line is grounded at distant end, and the other end of the battery is also grounded.

Haskin's Galvanometer.

Prime's Life of S. F. B. Morse

THIS work was authorized by the family and executors of the great inventor, compiled from original data. It includes the history of the invention of he telegraph and the many important business connections with those who were interested with Prof. Morse in the development of the telegraph; sheepskin; 775 pages; illustrated; $3.00.

Remit to and address Telegraph and Telephone Age, 253 Broadway, New York.

Lightning Flashes and Electric Dashes

A BOOK made up of bright, ably written stories and sketches, telegraphic and electrical, that should find a place in the home of every telegrapher; 100 large, double-column pages; profusely illustrated; $1.00.

Marconi Contract With The Post Office

THE text was issued in a White Paper on August 1st of the agreement between the Postmaster-General and Marconi's Wireless Telegraph Company with regard to the construction of a wireless telegraph station the beam system suitable for communication with Canada and capable of extension to South Africa, India and Australia.

A Treasury minute accompanies the agreement recording the approval of the Lords Commisssioners to the scheme, the salient features of which were announced in the House of Commons by the Postmaster-General.

It is stated in the minute that the company is to complete the station for communication with Canada within twenty-six weeks from the date on which the sites for the sending and receiving sections are placed at its disposal; and it undertakes to have a similar station available in Canada for communication with this country within the same period. Various safeguards are included in the agreement to prevent any excessive charges, and it is provided that the maximum cost, exclusive of the percentages, shall not be greater than £44,920 if a public electtrical supply is available, or £50,420 if a public supply is not available. If the station is extended, the cost of each additional unit (comprising sending and receiving sections) is not to exceed £29,106 if a public supply is available and £31,406 if a public supply is not available—exclusive in each case of establishment charges and profit.

The Postmaster-General, after consultation with the company, the minute states, is to fix such rates of charge to the public for the transmission of telegrams by means of the beam station as shall, in his opinion, be calculated to attract the largest possible volume of traffic, with due regard to economic consideration. The rates to and from Canada are not to exceed the existing rates, and those to and from other parts of the Empire are not to exceed two-thirds of the cable rates now in force. The Postmaster-General reserves the right to accept British Government telegrams at special rates.

An arbitration clause in the agreement is limited to disputes as regards the cost of the stations. It is provided that the agreement shall not be binding unless it has been approved by a resolution of the House of Commons.

The Imperial Wireless Scheme

THE announcement that the Government has decided to adopt the main recommendations of the DONALD committee with regard to wireless within the empire is a matter for congratulation after so many years of deplorable delay, but the insistence of the Marconi Company on the alleged advantages of the "Beam" system is difficult to understand. This short-wave or "Beam" system is not by any means new. It was tried by Hertz, over thirty years ago and even Mr. Marconi, himself, when he first arrived in England, in 1896, experimented with it over a distance of one and three quarter miles, but was dropped as the long-wave was found to be super-

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ior. It is generally admitted that "Beam" transmission is only possible during the hours of darkness and one or two hours just before and after twilight so that a telegram handed in during ordinary business hours would not be started on its journey until darkness fell, in fact the Post Office authorities declare it is only practicable for "Deferred" messages; that is, messages which can stand a delay of twenty-four hours. It should also be noted that even this limited period for transmission is subject to atmospheric conditions in the same way as all other wireless stations.

The hesitancy in adopting the new system shown by the Post Office Research Board cannot be ignored and this is emphasized by the Government's attitude in demanding that the tests for Marconi's idea shall continue for such a lengthy period as twelve months. The governments of India and New Zealand although willing to try the new idea domestically, definitely state that a "Beam" station will not meet their long distance requirements so that from the practical or commercial point of view, it is difficult to see how the substantial reductions of telegraphic rates, foreshadowed by Mr. Marconi in his recent lecture are to come about.

It is also stated by the Post Office Engineers that for long distance communication, high-power stations of the present type will still be necessary and in these circumstances it is rather disappointing to read that further delay will occur in the erection of such stations while experiments in the "Beam" system are taking place between Great Britain and Australia and South Africa.

Now that the government has at last produced a scheme which promises a solution of the much to be deplored paralysis caused by conflicting political counsellors, the interests of the Empire surely demand the completion of the scheme with all possible speed.

Government Competitive Cables

THE eighty-seventh ordinary general meeting of the West India and Panama Telegraph Company. Ltd., was held on July 30th at Winchester House, Old Broad Street, E. C., England.

Sir Alexander F. King, who presided, said that a year ago he still had a hope—not a very strong one, perhaps—that the Government might yet see the wickedness of their proposal to lay competitive cables in the West Indies and abandon the proposal, but that hope was dead. To his mind, the Government scheme was wrong in two ways. It was certainly wrong—to the shareholders of this company disastrous—to kill, chiefly for the sake of an idea, an undertaking like theirs, which, in face of many difficulties, had for over fifty-three years given a telegraph service to the West Indies. The scheme was also wrong, especially just now when the need of economy was so great, because it involved the expenditure of public money in the provision of a quite unnecessary service. The alleged excuse was that there ought to be an All-Red route to the British West Indies, but he failed to see that this was so important and so urgent as to justify the expenditure in present circumstances.

At present the company was earning a small profit, but after the 30th of September, when their contract with the Government came to an end, and they lost their subsidies of £26,000 a year and also the additional charge of 6d a word authorized last year, they would not be able to work except at a very heavy loss, especially as the Government cables would get the traffic at the British stations. Even, however, if this were not so, and if it were possible for the company to continue working and to retain the whole of the present traffic, there would be a deficit of about £500 a week for every week that they continued to work. The Debenture holders would have the first claim on any assets up to the amount of their issue—namely, £89,600—and he deeply regretted to say that there could not be, in his opinion, any surplus for the shareholders. He concluded by moving the adoption of the report and accounts.

George Chauvin seconded the resolution, which was unanimously adopted.

Books on the Submarine Cable

The following list of books comprises all of the works printed on the theory and practice and operation of submarine cables, and we recommend them to those desiring to familiarize themselves with cable subjects:

Baines, G. M.—"Beginner's Manual of Submarine Cable Testing and Working," has been thoroughly revised by its author and it was issued in fourth edition form on June 1st, 1921. The book measures 5½ inches wide by 8½ inches long, and contains 174 pages; fully illustrated; price, $4.50.

Bright, Sir Chas., F.R.S.E., M.Inst.C.E., M.I.E.E.—"Submarine Telegraphs"; 800 pages; $25.

Darby and Fisher—"Student's Guide to Submarine Cable Testing." Most recent book on submarine cable testing published. It is very complete and covers simple testing, measurement of copper resistance, capacity and its measurements, tests for breaks, the earth overlap, measurement of the resistance of an earth, and many other subjects pertaining to submarine cable work; $4.50.

Malcolm, H. W.—"The Theory of the Submarine Telegraph and Telephone Cable"; 566 pages, fully illustrated. This book explains the phenomena which underlie the working of the submarine telegraph cable and it is an exhaustive treatise on this subject. It is a book that every cable expert should possess; $10.

Munro and Jamieson's "Pocket Book of Electrical Rules and Tables," Twentieth Edition, for the use of electricians and engineers; $4.50.

Young, J. Elton—"Electrical Testing for Telegraph Engineers"; a practical book for all submarine cable engineers. The work is standard; 312 pages, fully illustrated; price, $4.50.

All of these books are in stock. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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Progress of the Telephone and Telegraph Systems

THE number of new telephone stations connected during May was 19,588, a particularly good figure. 8,671 telephones were ceased, making the total number working at the end of May 1,178,320, 417-220 in London and 761,100 in the Provincial districts.

The growth in exchange subscribers during recent months has averaged over 6,000 subscribers per month. The total at the end of May was 674,166 of which 202,546 subscribers were connected with the London system and 471,620 were distributed over the rest of the country.

The marked growth in residence rate connections, noticeable since the lower rates were introduced in July, 1922, is being well maintained. 4,575 new installations were added during May, while the cessations were relatively low at 1,540. The proportion of residence rate subscribers in London is higher than in the Provinces, the total of 70,768 representing more than one-third of the total exchange subscribers. In the Provinces there are 121,-365 private house subscribers, constituting one-fourth only of the total exchange connections.

With regard to rural statistics, 21 new exchanges were opened during May in rural areas, and a further 15 were authorized under the specially favorable terms conceded two years ago to stimulate the growth of the telephone service in outlying parts of the country. So far approximately 6,000 subscribers have obtained service under these terms, in respect of 474 exchanges opened. A further 128 exchanges have been authorized, but are awaiting completion.

In addition to the opening of new rural exchanges, over 100 rural party line subscribers were provided with service, making a total of 8,570 of these stations working at the end of the month.

The total number of call offices in rural areas was 5,549 at May 31, an increase of 48 over the April total.

In response to the special campaign last spring, in the interests of agriculturists, to induce railway companies to have telephones installed at their outlying stations, about 14 rural railway stations on an average have been linked up with the exchange system each month.

The total number of call offices working at May 31 was 17,879, 3,994 in London and 13,885 in the Provinces. The net increase for the past five months has averaged 95 per month. The number of street kiosks also is increasing at an average rate of 20 per month. The total at the end of May was 673, of which 21 have been erected recently in the streets of London.

Further progress has been made with the development of the local exchange system. Exchanges opened included the following:—Old Swan (Liverpool); Royal (Liverpool).

Among the more important exchanges extended were:—

LONDON.—Brixton, Purley, Wallington, Waltham Cross.

PROVINCES.—Torquay.

During the month the following additions to the main underground system were completed and brought into use:—

London—Bristol.

Birmingham—Worcester.

Burnley—Todmorden.

Birmingham—Stafford (section of Birmingham—Manchester cable),

while 89 new overhead trunk circuits were completed, and 66 additional circuits were provided by means of spare wires in underground cables.—Telegraph and Telephone Journal.

Back to Nature via the Automobile

BACK before the war the professional worriers were concerning themselves in a fervid way about the physical and mental deterioration of the human race as a result of modern ways of living, and especially on account of the tendency toward "living" in large cities. Moral, physical and mental deterioration was foreseen and loudly prophesied as an inevitable consequence of so many men, women and children losing contact with nature. The cry, "back to nature," was adopted and placarded everywhere, and many of us who had failed to think about the whither of our tending, allowed ourselves to be led into a great deal of worry about what our posterity would be like a thousand years hence.

Now we have the automobile and everybody is on his way back to nature. In the good old summer time we are at the business of getting back to nature all the time: in the evenings we drive out to the restful calm of the streams and the woods; on week-ends we extend our excursions to sylvan glades; and in vacation time, when we have a week or a month to spend, we allow ourselves to be possessed by our vagrant moods and wander hither and yon all over the face of the country. We sleep in the open, cook our own food, and live, in most of the details, as our fathers lived when they essayed to migrate from one section of the country to another. Automobiles from every state in the Union sing along the highways, and every second farmhouse has turned itself into a wayside lodging place.

We have not only discovered the means of universal recreation, but we have discovered an antidote for the wanderlust which attacks so many of us to the detriment of our content and well being.

It will pay you to become a subscriber to Telegraph and Telephone Age, price $2.00 per year.

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EDITORIAL COMMENT

England Will Never be Conquered by Babbitt

"ENGLAND will never be conquered by Babbitt. Her faith in advertising, her wish to sell herself to us and to the rest of the world, and her outlook upon the problems of business are all real; they are founded on good reasoning instead of being skin deep. Moreover she is conducting herself in so sensible a way that no budding writer of her intelligentsia or ours can turn her words and acts against her, as our young writers have satirized us.

"Some humorists pretended to feel alarmed when a couple of thousand American advertising men descended upon London. They suggested that Babbittism might be contagious, and that we might leave a trail of trite phrases, small-town oratory, and go-getters wherever we went. But the event proved otherwise. Very likely among our great army of advertising men there may have been some of the genus Babbitt, pseudo instead of real, full of hackneyed language. However, they were not in evidence; and instead of spreading any contamination in England, they must have come back cured. For, as I said before, London is sane, clear-cut and well-reasoned in her attitude and her acts."

This is the opinion of Philip L. Thomson, Publicity Director of the Western Electric Company, who has just returned from a European trip following his participation in the advertising congress at London.

"England is undergoing a change of heart. The old conservatism that kept its own counsel and asked no advice is changing, and today British business men realize the value of exchanging ideas. They are proud of the past—but equally proud of their modern industry and skill and these, they recognize need ideas from others. In the convention the attitude of the nation was that it stood ready and anxious not only to give of its best, but to take freely ideas based on our experience in the things in which we have gone further than they.

"Perhaps one additional bit of evidence that Babbitt stayed at home is that we saw no American under the influence of liquor at any time. Babbitt would surely have succumbed to temptation," said Mr. Thomson, "My first glimpse of an intoxicated man for several months was the day after my return on the ferryboat from Jersey to Manhattan.

"But the great proof of the soundness of the British on these subjects lies in the way they received the advertising delegations. If we, in this country, had arranged a gathering to compare with the gathering of public men in London we should have had to bring together a Coolidge, a Hughes, a Hoover, a Schwab, a Gary, a Pulitzer, a Vauclain, a Morgan, a Root, a Willard, and more. I defy any man not to think clearly under the spell of these outstanding minds of the British nation.

"And imagine Babbittism, so-called, in the presence of the Lord Mayor of London, appropriately ranked with high sheriffs, under sheriffs, beef-eaters, and varying grades of other officials. There is something in the tradition, the ceremonial, the very flavor of Old England which dispels the sort of vulgarity from which some of our young men think we suffer.

"Lord Leverhulme in his satin breeches and silk hose is just another instance."

Most of the advertising men found a formal banquet of England singularly impressive when a red-coated, periwigged master of ceremonies began by crying, "My Lords and Ladies and Gentlemen, I beg you wait the Dean of Durham who will say grace." A little later it was, "My Lords and Ladies and Gentlemen, I beg you charge your glasses and stand for Philip L. Thomson, President of the Association of National Advertisers of New York, who will give you the toast 'To the Ladies', with which is connected the name of Lady Astor."

This was to signify that Lady Astor was to respond to the toast. This she did in a sparkling speech which led Mr. Thomson to praise her in enthusiastic terms to a gentlemen who stopped to converse with him at the close of the banquet. Only after he had made something of a eulogy and left, did Mr. Thomson find that the man with whom he had been talking was Lord Astor.

At the close of the convention Mr. Thomson made a business trip to Holland, Belgium and France, and enjoyed a short vacation in the Swiss Alps.

Telephones in Lithuania

THE telephones in Lithuania are owned by the Government and are under the control of the Department of Ways and Communications. The telephone was practically unknown in Lithuania for general use until installed in 1915 by the Germans at the time of their occupation of the country. The apparatus was, however, recently replaced with apparatus manufactured in Esthonia by the Tartu Telefoni Wabrix A. S. The central exchange office at Kovno accommodates 1,012 subscribers. Nevertheless the number of telephones now in use is twice what it was a year ago. There are forty-four operators at the central exchange and besides giving local service a long-distance service is maintained to all parts of Lithuania, to Latvia, and to points from Kovno to Konigsberg, East Prussia, and to Berlin. A few banking establishments have installed private branch exchanges and the central office has provision for 200 such branches.

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Hawkin's Electrical Guide contains ten wonderly helpful and practical volumes, written in clear, ncise language, easy to understand, no wasted rds, full up-to-the-minute electrical knowledge, ich can be applied to problems that come up m day to day. You can carry a number of the oks with you until you have mastered the subcts. All subjects are indexed so that you can find e information instantly. Written in the modern estion and answer form. It's like having an elecical authority always at your elbow ready to swer any question you ask. 4700 pictures, 3500 ges, pocket size, flexible cover; price $10.00 for e full set of ten books. Address and make remitnces to TELEGRAPH AND TELEPHONE AGE, 253 roadway, New York.

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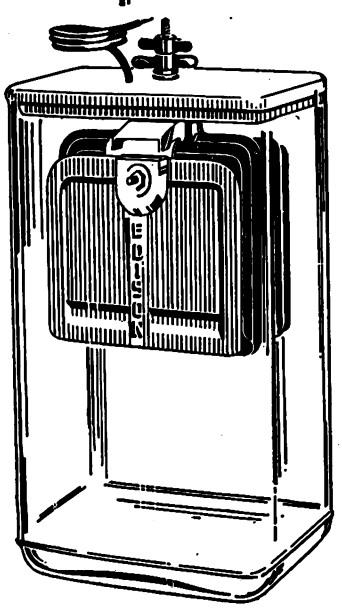

Standby Life

Edison Primary Batteries have an indefinite standby life. On the shelf or in any open circuit, Edison Cells are always resting because of the small amount of internal chemical reactions.

Yet, when called upon for real action, Edison Primary Batteries are always on the job, doing the work they do the best—supplying a dependable source of energy for Telephone Service.

Edison Cells last about twelve times as long as dry cells, supply a uniform voltage throughout their entire rated life and will give more dependable service at a lower cost than any other form of battery energy.

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EDISON SIGNAL BATTERIES-PRIMARY and STORAGE
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ST. LOUIS
Railway Exchange Bldg.

CHICAGO
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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

the Telegraph and Telephone Section:

Copies are now being distributed of reports, in k form, to be presented to the Telegraph and ephone Section, at its session to be held at the ateau Frontenac, Quebec, P. Q., on Tuesday, dnesday and Thursday, September 9, 10 and 11, follows:—

Committee No. 1—Construction and Maintenance Outside Plant. Sub-Committee "A"—Construc- n and Maintenance of Pole Lines, Wires and bles. Sub-Committee "B"—Wire Crossings. Sub- mmittee "C"—Underground Construction. Sub- mmittee "D"—Transpositions.

Committee No. 2—Construction and Maintenance Inside Plant. Sub-Committee "G"—Apparatus, aterial and tools. Sub-Committee "H"—Locations d Layouts. Sub-Committee "J"—Circuits and rrent Supply. Sub-Committee "K"—Installation d Maintenance.

Committee No. 3—Protection Against Elec- olysis.

Committee No. 4—Electrical Protection.

Committee No. 5—Telegraph and Telephone evelopment.

Committee No. 6—Message Traffic.

Committee No. 7—Inductive Interference.

Committee No. 10—Education and Training of elegraph and Telephone Employees.

Committee No. 11—Telegraph and Telephone Transmission.

Committee No. 12—Radio and Wire Carrier Systems.

Report of Committee on Nominations.

Report of Committee of Direction—Nominees for Committee on Nominations.

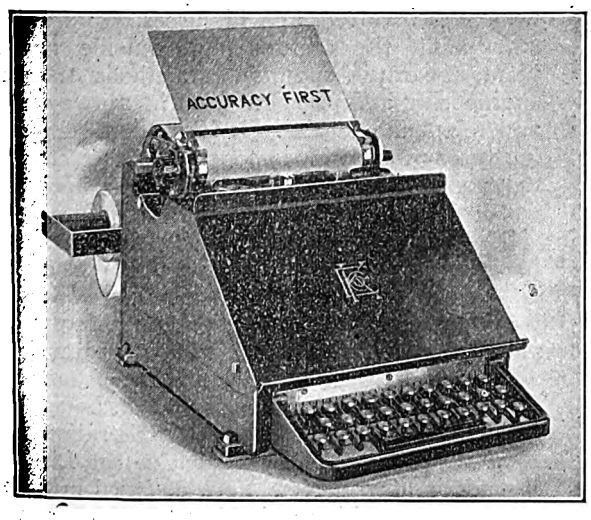
Paper entitled "A. C. Mil-Ammeter Method of Testing Open Wires," by R. T. Davenport, Plant Supervisor, Postal Telegraph-Cable Company.

The papers entitled "Machine Switching Private Branch Exchanges and Their Application to Railroad Service" by W. H. Harrison, Central Office Engineer, American Telephone and Telegraph Company; "The Detection and Location of Trouble on Telephone and Telegraph Circuits" by H. S. Osborne, Transmission Engineer, American Telephone and Telegraph Company; "Prolonging the Life of Our Pole Line Timber" by P. J. Howe, Construction Engineer, The Western Union Telegraph Company, and "Effects of Aurora Borealis on Communication Circuits and Means of Mitigation" by John B. Taylor, Consulting Engineer, General Electric Company, will be forwarded to you prior to the session of the Section.

Your attention is respectfully called to Paragraph E-3 of the Regulations of the Section, reading as follows:

E-3 Upon receipt of Committee reports, papers, etc., to be presented at the Annual Meeting, members shall consider the subjects carefully and submit written criticisms to the respective Chairmen of

EVERY USER IS A KLEINSCHMIDT BOOSTER



ONE CUSTOMER WRITES:

We are having little or no trouble with our machines. One man is taking care of twenty Telegraph Typewriters and he devotes part of his time to other matters.

ANOTHER WRITES:

We wish to advise you that your Telegraph Typewriters are working fine and doing everything you guaranteed them to do. We find the system one for efficiency and an asset to our working organization.

A THIRD WRITES:

Both machines gave excellent service and had hard usage as the test work is sometimes rougher than regular work on good lines.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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the Committees before the meeting so that the Committee concerned can consider the suggestions before the meeting and be prepared to make such changes or explanations as may be deemed desirable."

Any criticisms or suggestions you may desire to forward to the Chairman of any Committee will undoubtedly be welcome and given full consideration.

Respectfully,
W. A. FAIRBANKS,
Secretary.

THE thanks of the members of the Telegraph and Telephone Section of the American Railway Association are due W. A. Fairbanks, the secretary of the Association. Mr. Fairbanks has been painstaking in his endeavors to please the members of the Association and his efforts in that direction have been successful.

The Committee of Direction will meet at the Hotel Frontenac on September 7th, for the purpose of transacting routine business.

Committee No. 1—Construction and Maintenance of Outside Plant will hold a meeting at Quebec on September 8th, to consider criticisms and suggestions on their report, which has been issued and distributed to the membership.

Committee No. 2—Construction and Maintenance of Inside Plant will hold a meeting in Quebec on September 8th, to review the suggestions and criticisms received on their report and acted thereon.

The new Committee of Direction to be elected at the Quebec session will hold a meeting following the adjournment of the session when appointments of new committees and the mapping out of work for the new year will be accomplished.

The following is a complete list of the places and time of meeting of the Telegraph and Telephone Section of the American Railway Association:

Chicago, 1882, 1883, 1902, 1917, 1918, 1919; Philadelphia, 1884; Cleveland, 1885; St. Paul, 1886, 1916; Boston, 1887, 1911; New York, 1888, 1912; Washington, 1889; Niagara Falls, 1890, 1897; Cincinnati, 1891; Denver, 1892, 1906; Milwaukee, 1893; Detroit, 1894, 1900, 1909; Montreal, 1895, 1908; Old Point Comfort, 1896; Omaha, 1898; Wilmington, 1899; Buffalo, 1901; New Orleans, 1903, 1914; Indianapolis, 1904, Chattanooga, 1905; Atlantic City, 1907; Los Angeles, 1910; St. Louis, 1913; Rochester, 1915; Winnipeg, 1920; Cleveland, 1921; Richmond, 1922; Chicago, 1922, and Colorado Springs, 1923.

Coming Conventions

OLD TIME Telegraphers' and Historical Association, Hotel Roosevelt, New Orleans, La., October 30th, 31st and November 1st.

Telephone Pioneers of America, Chicago, October 10th and 11th.

Telegraph and Telephone Section of the American Railway Association, Hotel Frontenac, Quebec, Que., September 9th, 10th and 11th.

Radio Corporation of America

GENERAL JAMES G. HARBORD, President, an former chief of the A. E. F. service of suppl Brig.-General Dawes, former chief purchasi agent of the A. E. F., and now Republican vic presidential nominee, held a reunion, on Augu 17, with their former commander General Pershin who retires from active service early this month.

The meeting was held at the Dawes home i Evanston, Ill., and all day long it was "Jack," an "Charlie," and "Jim" as the three comrades o overseas recalled the days in France in 1917 an 1918.

General Harbord, President, will give his fare well tribute to his former commander, Gener Pershing who is retiring from active service th month, at the Government Club Dinner to Gener Pershing at the Hotel Astor, on September 9th.

The Radio Corporation of America, Research an Test Division under the direction of Dr. A. N. Gold smith, Chief Broadcast Engineer and Director o Research, is now located in its new quarters, Va Cortlandt Park, South and Saxon Streets. It wa formerly housed in the Electrical Laboratory build ing at City College, which long ago proved inade quate.

Telegraphy and Telephony with Railroad Applications

TELEGRAPHY and Telephony with Railroad Appli cations by Charles Stanley Rhoads, E. E., is new book now being placed on the market by th Simmons-Boardman Publishing Company. It is book that will meet a long felt demand. This ne book was written to give the whys as well as th accepted practices. Telegraphy and telephony set forth in straightforward style the fundamenta principles involved, and discusses, from a practica standpoint, the organization, outside and inside plant, apparatus, circuits and methods of operation engineering and practices used in railway telegraph and telephone service. Information gathered dur ing years of experience, together with facts as to the most recent developments, make the book one you will want to keep for frequent reference.

The author's early training with one of the Bell telephone companies and with the Western Union Telegraph Company on construction work was fol lowed by several years with manufacturers of tele phone train dispatching equipment, after which he was successively telegraph and telephone engineer for the Cleveland, Cincinnati and St. Louis Railway, the United States Railroad Administration, Eastern Region, and the New York Central Lines. Mr. Rhoads is now in New York engaged in the main tenance of machine switching telephone service.

This book measures five inches in width by seven and three-quarter inches in length, and contains 485 pages, with 139 illustrations. The price is $3.00 per copy. Address all orders and make remittances to Telegraph and Telephone Age, 253 Broadway, New York.

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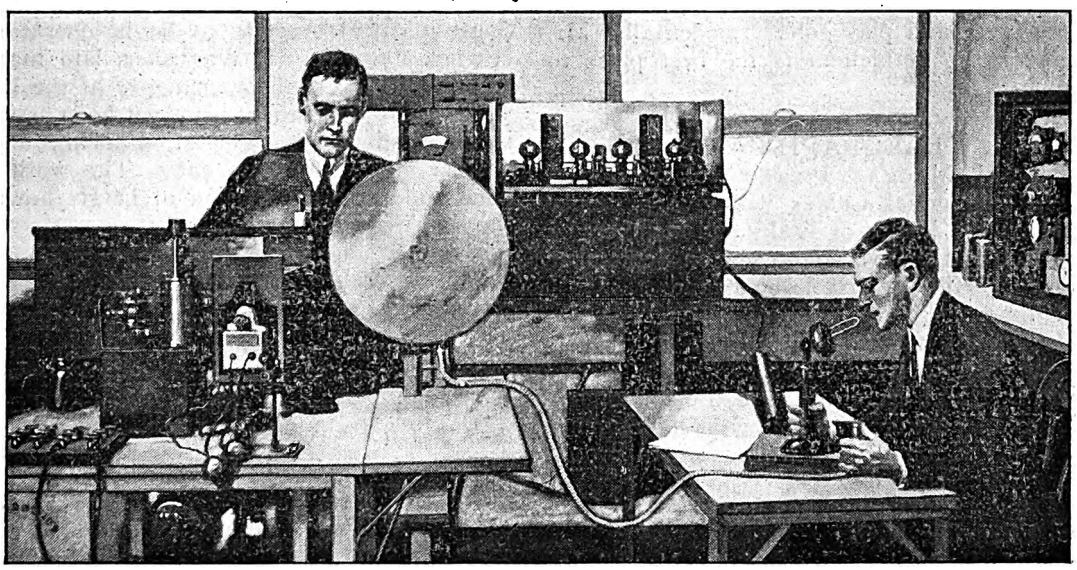

In the Bell System laboratories speech sounds are recorded on the oscillograph with a view to their subsequent analysis

The service of knowledge

The youthful Alexander Graham Bell, in 1875, was explaining one of his experiments to the American scientist, Joseph Henry. He expressed the belief that he did not have the necessary electrical knowledge to develop it.

"Get it," was the laconic advice.

During this search for knowledge came the discovery that was to be of such incalculable value to mankind.

The search for knowledge in whatever field it might lie has made possible America's supremacy in the art of the telephone.

Many times, in making a national telephone service a reality, this centralized search for knowledge has overcome engineering difficulties and removed scientific limitations that threatened to hamper the development of speech transmission. It is still making available for all the Bell companies inventions and improvements in every type of telephone mechanism.

This service of the parent company to its associates, as well as the advice and assistance given in operating, financial and legal matters, enables each company in the Bell System to render a telephone service infinitely cheaper and better than it could as an unrelated local unit.

This service of the parent company has saved hundreds of millions of dollars in first cost of Bell System telephone plant and tens of millions in annual operating expense—of which the public is enjoying the benefits.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

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PERSONAL

P. J. FAULKNER, manager, Southern Pacific Company, New York, has gone to Bethlehem, N. H., to dodge hay-fever and play golf. Incidentally, Mr. Faulkner says: "Bethlehem is the best place to get rid of hay-fever."

POSTAL TELEGRAPH-CABLE CO.

CLARENCE H. MACKAY, President of the Postal Telegraph-Commercial Cables will give a dinner and dance for the Prince of Wales and members of the American and British polo teams on September 6th at Harbor Hill, Roslyn, Long Island.

C. A. COMSTOCK, vice-president, is on his vacation. He intends taking an extended motor trip through the New England states.

William B. Dunn, secretary, is also on vacation.

F. J. Kernan, auditor, who is now at his Summer home at Cedar Knolls, N. J., will return to Brooklyn on or about September 1st.

F. H. Dennis, bookkeeper, has just returned from a visit to Ellenville, N. Y.

Mrs. C. M. Roebuck, cashier of the Mutual Investment Credit Union, is now on vacation at Gloversville, N. Y.

Miss M. F. Moriarity, chief clerk in the plant department, is spending her vacation at Monticello, N. Y.

DR. LAWRENCE J. CARDONA, brother of J. J. Cardona, assistant treasurer, died suddenly at his home at 804 Lafayette Ave., Brooklyn, on August 22nd. Dr. Cardona who graduated from the Long Island College Hospital in 1890, was widely known for his work among the poor. He was chairman of the board of directors of the Batterman Memorial Hospital, and the Bushwick and East Brooklyn Dispensary. Funeral services in the Lefferts Place Chapel were attended by the delegation from the dispensary medical staff, the Long Island College Hospital Association and the Veteran's Association of the Fourteenth Regiment, of which he served as captain for thirteen years.

New York City

MISS TESSIE PANDOLFI, operator in the City Division, has returned to the office after five weeks in a hospital, a slight operation causing her absence.

Miss Kitty Lynch, operator on the Hartford Local, sailed for Ireland to visit her folks. She was the recipient of several beautiful bouquets, and a handsome traveling bag from her friends at the office.

J. B. Havice, Southern Quadruplex Chief, was confined to his home for two weeks by a painful boil on his face, which required surgical treatment.

Harry Vernon, who works on the Eastern Circuits, broke into organized baseball recently when he shook hands, and congratulated Dazzy Vance, the Brooklyn Nationals star pitcher, after Vance twirled one of his sensational games.

Vincent Vecchio, Quadruplex Chief, is back on the job. Vecchio hurt his back several months ago, and submitted to treatment which kept him home for nearly two months.

THE Postal Telegraph-Cable Company will establish a repeater station at Phoenix, Ariz., at 110 South Central Avenue to be in operation about August 20th. C. H. Waggener, late manager of Lexington, Ky., will be manager of the new office The rest of the staff has not yet been assigned. It is expected to get Tucson, Phoenix and Yuma opened about the same date. The work is being done under the supervision of D. H. Townsend of the San Francisco office.

OBITUARY

HIRAM SAUNDERS WATERS, a Postal Telegraph-Cable Company employee of Chicago since early in 1883, died on August 11th. "Hi" Waters, as he was popularly known among Board of Trade members and fellow-workers, had been manager of the company's Board of Trade office for over a quarter of a century.

Mr. Waters was born at White Lake, Mich., in 1851, and commenced his career as a messenger at Grand Haven, Mich., in 1860, and was promoted to the position of signal operator in 1862, where he remained until 1866, when he went south for a year or so, working in several places in that section. He returned to Chicago, where he accepted a position with the American District Telegraph Company, and built what is known as District 8, which district he managed for four years, when he drifted to the Board of Trade. He next built a line known as the "Packers Line," between the Board of Trade and Union Stock Yards, but like all other oppositions he was gobbled up by the Western Union Telegraph Company, when he accepted the position of manager of the Mutual Union Telegraph Company on the Board of Trade, until its demise, when he turned his attention to the Stock Yards and was the originator of the electric light plant at that place, which finally went into the hands of a syndicate. Mr. Waters was then offered the position of manager of the Postal Telegraph Company's Board of Trade office, which position he held until 1892, when he accepted the position with Manager D. S. Anderson as solicitor on the floor. It is safe to say that no one man on the Exchange enjoyed more friends, held in higher esteem among the brokers than he. Mr. Waters was a great lover of athletics and had the honor of having won the title of champion amateur boxer of America, having competed in all classes and cities. He had done much to promote athletics, having held the positions of lieutenant of the Board of Trade gymnasium, and was a charter member of that famous Chicago Athletic Club, the finest of its kind in the country.

Give Her Room

Bill (teaching her to drive): "In case of emergency, the first thing you want to do is put on the brake.

She: "Why I thought it came with the car!"

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THE WESTERN UNION TELEGRAPH CO.

W. J. BLENHEIM and R. L. Jones are making a trip of inspection to the cable stations in the Maritime Provinces.

J. J. Welch, vice-president in charge of traffic, is on vacation.

H. G. Heininger, superintendent of traffic, Atlanta, Ga., was a caller at the executive offices a few days ago.

A. D. Taylor, aged seventy-four years, for many years past a member of the force at the Produce Exchange, New York, died on August 11th.

George W. Reynolds, aged seventy-seven years, Chicago, died on August 15th.

A. J. Lombard, the well known old time telegrapher of Washington, D. C., died in that city on August 20th.

Charles J. Lipman, aged seventy years, for many years in the brokerage business at Philadelphia, died on July 25th.

C. R. NICHOLS has been appointed chief operator at Houston, Texas, vice L. I. Flowers, who has been appointed chief operator at Houston, Texas.

E. R. Parker, has been appointed chief operator at Galveston, Texas, vice C. R. Nichols.

On August 1st the Erie, Pa., office changed from non-functional to functional operation and W. P. Miller was appointed acting chief operator.

A Dollar's Worth for the Tax Dollar

RECENT studies of the nature and trend of public expenditures, by the American Academy of Political Science and others, make it plain as noonday that the only hope the American people need entertain for tax reduction lies through demands for a dollar's worth of service and goods for every tax dollar expended. Attention has frequently been called to the growth of expenditures by states, counties and cities during the period since the outbreak of the war, but public interest in Governmental expenditure and taxation has remained centered on Washington, the higher visibility of national expenditures and tax gatherings drawing the public eye away from the seemingly less important spendings of the states and the cities.

In view of the fact that something over 90 per cent. of the revenue of the Federal Government in 1922 went to pay the cost of past wars and that strictly civil expenditures were only 80 per cent. above pre-war, it will astonish many complacent persons when they discover that in comparison with 1913, state expenditures in 1922 showed an increase of 235 per cent.—and that without any important expenditures growing out of the war. No allowance is made for the change in the purchasing power value of the dollar in these comparisons. If the items were reduced to the basis of the 1913 dollar, it would be seen that the civil expenditures of the Federal Government showed only moderate increases in comparison with the expenditures by the states. Only expenditures from revenues—various forms of taxes and other income—are referred to, the vast capital sums raised by the states and other departments of government during the last few years being left out of account.

In 1922, the latest year for which data are available, the expenditures of the 48 states comprising the American Union were more than three times their expenditures in 1913. The per capita cost of state government increased from $4 in 1913, to nearly $12 in 1922. In the period from 1913 to 1924 the per capita cost of civil expenditures by the Federal Government increased only $1.22. The Federal Government is spending vastly more than in 1913, but most of it is going in payment for the war, for pensions, bonuses, interest and the like.

It is evident that very little more in the way of a reduction in Federal expenses is to be expected by means of major operations; savings have already been obtained at the cost of needed services. The taxpayer can find a more attractive field for his efforts toward lowering the expenses of government by turning his attention to the spendings of the states and cities. Examinaion of the nature and character of these expenditures reveals that the increases in expenses of state governments have been mainly due to the increased maintenance cost of highways and to the support of educational and charitable institutions. The experts who have investigated the matter are of the opinion that no reduction in operations in either of these fields is desirable and conclude that expenditures in them should be continued. They find that the way to reduction in taxes, without impairment of the services being rendered by the states, lies through concerted and aggressive demands for increased efficiency in the handling of state and municipal funds and through the taxpayer getting a dollar's worth for every tax dollar he pays. They recommend the adoption of approved budget systems placing responsibility upon executives, a weeding out of the spoils system in job giving, and the elimination of waste of public money, through standardization of specifications and more careful inspection of public works.

Telegraph Statistics

THE telegraph statistics for the Dominion of Canada for 1923 show that the wire mileage has increased from 262,343 to 270,782 miles, of which 97,055 were in Ontario, 33,666 in Saskatchewan and 31,560 in Quebec. 128,008 miles belonged to the Canadian Pacific Railway, 92,545 to the National Telegraph Company, 18,593 to the Western Union Telegraph Company, and 15,253 to the State. The total number of land messages transmitted was 16,150,106, and of cablegrams 1,302,224. Of the 4,930 offices open, 1,709 belonged to the National Telegraph Company, 1,457 to the Canadian Pacific, and 1,342 to the Dominion Government.

LONG-DISTANCE telephone communication has recently been established between Leningrad and Reval.

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All America Cables

OPERATOR A. WEBSTER, resumed duty at Lima, Peru, after a furlough spent in Scotland.

Clerk-in-Charge J. Clark left England for Buenos Aires, Argentine, on return from furlough.

Manager T. H. Burns leaves England for La Paz, Bolivia, on return from furlough.

Operator J. W. McCully, left New York for Morgan City, La., where he will be stationed.

Operator C. K. Dibella, left Galveston, Texas, for Morgan City, La., where he will be stationed temporarily.

Secretary Hoover Calls Third National Radio Conference

ANNOUNCEMENT was made on August 26th by Secretary Hoover of the calling of the Third National Radio Conference for the Better Voluntary Regulation of Radio. The Conference will be held at Washington, beginning September 30th.

Two such conferences have already been held, one in February, 1922, and one in March, 1923, both of which were generally attended by the persons and organizations interested. The result has been a lessening friction and misunderstanding through the voluntary cooperation of the industry, the public and the Department of Commerce, especially in the reduction of interference and the improvement of service.

The growth of radio and particularly the multiplication of broadcasting stations and the consequent congestion of the air has made necessary a consideration of many subjects and perhaps a revision of some present methods. Some of the matters which will be discussed and considered at the Conference are:

Revision of the present frequency or wave length allocations, to reduce interference.

Use of high frequencies or short waves.

Classification of broadcasting stations; possible discontinuance of Class C stations.

Interconnection of broadcasting stations.

Limitation of power; division of time; zoning of broadcasting stations.

Means for distinguishing the identity of amateur calls from foreign countries.

Interference by electrical devices other than radio transmitting stations.

Relations between government and commercial services.

Such other topics as may be proposed by the Conference.

To facilitate the work of the Conference the various groups in the radio field will be asked to name representatives who will constitute the formal advisory committee of the Conference. As at present planned, the groups to be represented will be as follows:—Listeners, Marine Service, Broadcasting, (one from each inspection district); Engineering, Transoceanic Communication, Wire Inter-Connections, Manufacturers, Amateurs, Point-to-point Communication, Government Departments.

The committee so constituted will hold public hearings. All persons or organizations having any suggestions to make or views to express upon any features of radio activity are urged to attend and will have full opportunity to be heard.

Some of the matters suggested for consideration are not within the regulatory control of the Secretary. As to such matters, any conclusions reached by the Conference can become effective only by voluntary adoption by the interests affected. As to the features falling within the powers of the Secretary the recommendations of the Conference will be advisory to the Department.

Many States Benefit by Zoning Legislation

APPROXIMATELY 24,000,000 people, living in 261 municipalities throughout the United States, are enjoying the benefits of zoning, according to statistics complied by the Division of Building and Housing of the Department of Commerce. The greatest zoning center is in the territory in New York State and northern New Jersey, having New York City for its hub; other centers are in California, Ohio, Massachusetts, Illinois and Wisconsin.

Secretary Hoover, in a recent statement, characterized properly drawn zoning ordinances as "reasonable, neighborly agreements as to the use of land." They divide a city into districts in which are limited the use to which land and structures may be put; the height and number of stories of the building; and the areas of the lots to be occupied by the buildings. Their professed object is to regulate the use of private real estate for the purpose of promoting health, safety, morals and the general welfare of the entire community.

That the idea has made a strong appeal to the American people is shown by the rapid spread of zoning. On January 1, 1923, there were only 129 zoned cities, towns and villages. The first comprehensive effort to zone was the passage of a zoning ordinance by New York City in 1916; although Los Angeles, Calif., passed a "Use" ordinance in 1909, and Boston, Mass., regulated the height of buildings in 1904.

Cities, towns and boroughs throughout the country generally are showing more than a passing interest in zoning. Where authority is granted, various municipalities are actively engaged in the solution of their zoning problems with enthusiastic zoning commissions and auxiliary committees at work. Even where state legislation does not authorize zoning, various public-spirited and progressive organizations are studying the local situation so that when zoning can be effected legally, much of the preliminary work will be finished.

New Jersey leads in the number of zoned municipalities, having 66; New York has 41; California, 33; Illinois, 25; Massachusetts, 24; Ohio, 16; Wisconsin, 13; Indiana, 5; Michigan and Missouri, 4 each; Iowa and Rhode Island, 3 each; Florida, Michigan, Oklahoma, Pennsylvania, Virginia and Washington, 2 each; and Arkansas, Colorado, Connecticut, Georgia, Maryland, Nebraska, North Carolina, North Dakota, South Carolina, Tennessee, Utah and the District of Columbia, one each.

The complete list of zoned municipalities can be secured from the Division of Building and Housing's Department of Commerce, Washington, D.C.

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udson Bay Company Installs Radio Sets in Outposts

AST year as an experiment the Hudson's Bay npany installed eight Canadian Westinghouse npany's Receiving Sets at various outposts from es Bay to above the Arctic Circle, and at Camps the Labrador Coast and on the Hudson Straits. ue to the remarkable results achieved, the Hud- s Bay Company made arrangement to install a e number of Canadian Westinghouse sets for r various Arctic and Sub-Arctic posts. In addi- to these, both the Hudson's Bay Company's ts, the "Nascopie" and the "Bayeskimo", each ied with them Westinghouse Short Wave Set de- ed to pick up not only "KDKA's" short wave smissions, but also the short wave telegraph smission of the C.G.S. "Arctic."

Each boat carries both a standard Canadian West- house Receiver and a special short wave receiver, tests will be made as to the relative merits of various wave lengths. Short wave tests were de aboard both of these boats before sailing, and DKA's" short wave transmission was perfectly eived. On one test no aerial available, but the e organ recital from KDKA was received on ut 10 or 15 feet of ordinary hay wire, one end which was simply tied to an ordinary life boat or k, no insulators being used.

In addition to these, the C.G.S. "Arctic" is not y equipped with a Canadian Westinghouse Short ave Receiver, but has aboard a 120-meter short ve transmitter designed and built by the Radio- egraph Branch of the Dominion of Canada at tawa.

It is anticipated that somewhere along Baffin's nd or along the Greenland Shore that the "Arc- " will be able to get in touch with "WNP", the acMillan expedition, in which case they will en- avor to relay word back through these two Hud- n's Bay boats, to the Labrador Coast Stations and en on, informing "KDKA" that they are in touch th MacMillan. Then Pittsburgh will endeavor relay messages through the "Arctic" direct to the acMillan Expedition.

The "Arctic" has aboard a special Canadian West- ghouse Short Wave Receiver for Donald Mix, the ireless Operator of the "Bowdoin" and as soon this has been delivered by the "Arctic" it is an- ipated that "KDKA" will attempt direct short mmunication with the MacMillan Expedition.

The "Nascopie" of the Hudson's Bay Company is boat of about 1500 tons. It was specially built for ork in the ice, has a double steel hull and is capa- e of going through ice of considerable thickness the bow is reinforced for work of this nature.

The "Bayeskimo" is a steel boat of about 700 ns and was not especially designed for Arctic ork, hence this particular boat does not go as far orth as the "Nascopie".

After these boats have made their annual trip, ey touch at St. John's, Newfoundland, and then oss immediately to Scotland where they discharge eir cargoes of furs and lie in port until the follow- g year.

Acme Commodity and Phrase Code

THE Acme Commodity and Phrase Code, price $30.00, has just been placed on the market. It seems as though the last word has been spoken in cable codes, but the authors tell us that their code is the best so far devised, and will meet with every success. The Acme Code is no exception. This code consists of one hundred thousand five-letter code ciphers with at least two-letters difference between each and every word. No transposition of any two adjoining letters will make another word in the book, and it is asserted that it is the first time this feat has been fully accomplished for 100,000 words.

Another merit is that one-letter mutilations practically detect themselves.

Elimination of transpositions make for better transmission of messages, which is the object sought both by cable companies and users.

It enables cable companies to give more perfect service and when errors do occur, makes detection of mutilation easier.

Time being the essence of all cabling, freedom from error insures the maximum benefit from any interchange of messages. Often offers expire or markets change before corrections can be secured.

Using the Acme Code, maximum safety is assured. This must appeal to every code user.

Claims made for facility and simplicity in coding messages thereby saving words and cost have usually been disappointing. The Acme Code has been compared with all general codes and proved its worth. Even against a complicated and comprehensive private lumber code with which a test was made, the Acme Code effected a saving. We request users to test the merits of the code for themselves and be convinced.

Its easy and simple operation, combined with saving in cost commends its use for domestic as well as foreign messages.

Intelligent, sustained, and experienced effort has been made to correct the known shortcomings and deficiencies in codes generally.

Twenty-five thousand ciphers are allotted to commodities.

A new idea has been attempted in general codes. A close analysis will bear out that the Acme Code represents the very last thought in codes, that it is in effect what we have tried to make it—a general code embodying a number of private codes compiled to cover special trades, but all combined in one book, affording a simple, safe, elastic, cheap but effective and comprehensive means of cabling.

Only by a thorough examination will the worth of these be understood and appreciated.

Address all orders and make remittances to Telegraph and Telephone Age, 253 Broadway, New York.

W. J. CAMP, now retired, sends us from Florida, a photograph of himself. The picture shows Mr. Camp lighting his pipe. It was taken last March while he was in Florida.

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BOULDER

Automatic Telephone Systems

AUTOMATIC Telephone Systems, Volume Three, by William Aitken, M. I. E. E., A. Am. I. E. E., author of Aitken's Manual of the Telephone, has just been placed on the market.

The preface reads: "This volume completes this work, but by no means exhausts the subject. It is believed that all the important systems have been described that either are in use, or nearly ready to be brought into use, but the great amount of inventive ingenuity displayed in late years in new design makes it impossible to describe all of these. It is felt that many of the latter are speculative, and while worthy of being protected and recorded in the Patent Publications, are of too complicated a nature for production in such a work as this, until some indication is given that they have advantages over established systems.

As regards standardization, the introduction of the Strowger Director System by the British Post Office for London and other large areas of this country practically means that step-by-step switch systems will become standard practice. This system is widely used in practically every country of the world, but it must be noted that the sysems with power-driven mechanism are also being very widely adopted elsewhere. On the Continent of Europe the Rotary system is being introduced into many of the large cities, as is also the system with rotary and radial switches for 500 lines. In the United States the Panel System has been installed in a number of towns, and that number is increasing, while the installing of that system in New York is well in hand.

It was intended that all large sheets of diagrams should fold in one direction only, but it has been found necessary to depart from that in two cases, the diagrams being folded in two directions. It is realized that these are more liable to be torn, but it was thought better to incorporate them in such a form that they could be readily read, rather than to reduce them further.

This book measures eight and a quarter inches in width by ten and a half inches in length, and contains 340 pages, with 147 illustrations. The price is $12.50 per copy. Address all orders to Telegraph and Telephone Age, 253 Broadway, New York.

Electrical Measuring Instruments

A NEW book, just off the press, Electrical Measuring Instruments, part one, commercial and indicating instruments, has just made its appearance. It is a large and comprehensive book of 440 pages, seven and a quarter inches wide by nine and a half inches long, and was written by C. V. Drysdale, O. B. E., D. Sc., M. I. E. E., and A. C. Jolley, A. M. I. E. E., two English electrical engineers. The preface reads: "So many books have appeared dealing with electrical instruments that some apology would seem to be necessary for issuing yet another one. There seems, however, to be a real need for a book which will be to the designer, and constructor of electrical instruments what the various book on dynamo design, etc., are to the electrical engineer, and which will also give the user of such instruments detailed information concerning importan points of construction and performance of the multifarious types of measuring instruments. The present volume has, therefore, been written as an attempt to meet this need, and although no one ca be more conscious than the authors of its defect and imperfections, it is hoped that it may do some thing to satisfy it. Unfortunately the mass of material now available has made the work of discrimination and comparison very laborious, and even a these pages have been passing through the pres many important new developments have been takin place, notably as regards improvements in magneti material, which could not be included.

In order to avoid any suspicion of bias in th comparison of various types of instruments, th measurements have nearly all been made on instru ments which have been purchased in the ordinar way, and the descriptions are nearly all based o actual examination of the instruments, quite in dependently of makers' description and claims. A few makers, however, have kindly lent instrument or given information on the distinct understandin that they would be dealt with entirely on thei actual performance, and the authors desire to ac knowledge their indebtedness to these firms.

The volume now issued deals almost entirely wit direct indicating instruments, as it was felt tha laboratory instruments have been much better deal with in existing books. Should the present wor meet with favor such instruments may be similarl dealt with in a second volume.

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CONTENTS.

Prolonging the Life of Our Pole Line Timber. By P. J. Howe..... 412

A Book About Success..... 415

The Gulstad Relay..... 416

Facts About Electricity..... 417

The Italian Cable. Meeting of the Institute of Radio Engineers. The Chateau Frontenac..... 418

Sarnoff, Back from Europe, Backs Long Waves for High Power Radio. Telegraph and Telephone Life Insurance Association..... 419

A Few Hints Regarding the Adjustment of Telegraph Apparatus..... 420

New Cable..... 421

Concession Terms for Buenos Aiares-Montevideo Cable. New Telephone System Project in Gibraltar. Radio at Sea. Radio Service Between Syria and Yugoslavia. Milwaukee's Telephones..... 423

Editorial Comment. Commercial Wireless Business. Automatic Telephony. Busiest Year for Western Electric. Some Interesting Facts Concerning the Telephone..... 424

Effects of Aurora Borealis on Communication Circuits and Means of Mitigation. By John B. Taylor..... 427

Personal. Postal Telegraph-Cable Company..... 431

Western Union Telegraph Company..... 432

Radio Corporation of America. All America Cables. Obituary..... 433

New British Guiana-Barbados Cable..... 434

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Prolonging the Life of Our Pole Line Timber

By P. J. Howe
Construction Engineer, Western Union Telegraph Company, New York

THE subject of this talk has been called "Prolonging the Life of our Pole Line Timber." The word "our" has been used with a definite purpose and intent, because the problems which I shall discuss are problems that are of vital concern to you of the railroads, just as they are to us of the Telegraph Company. We are all together in this Telephone and Telegraph work and our interests certainly are common. The conservation of the timber resources of this great land is a matter which not only concerns the man who buys and uses poles, but it affects every man, woman and child whose comfort depends, more than they realize on the trees which are the great gift of our Creator.

If you will picture in your minds a line of poles spaced regularly, say 150 ft. apart, and extending out from this City to the westward, on and on to the western boundaries of our land, and then if you can imagine it extending on across the ocean, across the continents of Asia and Europe, and back again from the East to this City, and then if you will picture seven more similar lines of poles completely encircling this old world of ours, you will have a fairly accurate idea of what I have in mind when I say "our pole line timber." And then you perhaps can visualize how many fine specimens of God's trees have had to be sacrificed in order to carry on our communication business. Next, if you will visualize how slow and stealthy decay is gradually eating toward the heart of every one of these poles, and every one of them will sooner or later end its usefulness and disappear, you will have yet another picture of the vast number of trees which must still be brought out of the forests to take their place in these pole lines of ours.

The pole line plant with which the Western Union Telegraph Company is concerned extends over approximately 214,000 miles of our Country. It contains, in round figures, about seven and one half millions of poles. Each year approximately 400,000 of these poles end their period of usefulness and are replaced by new ones. You can figure out for yourselves what this means to our forests, and what it costs in dollars and cents. It means an expenditure, each year, that runs into millions of dollars and, furthermore, it brings us, each year, just that much nearer the time when our stand of virgin pole timber will no longer exist, and when we must look to other means for holding up our vast network of communication wires and cables.

Let us, just for the sake of argument, assume that the replacing of each pole, including all material, labor, wire handling, etc., will cost us, in round figures, about $15. This means that we will spend in the neighborhood of six million dollars each year to satisfy the God of Decay. And the following year will have to spend another six million dollars, and so, on and on. Now suppose that, in some way we can make these old poles last a few years longer. We won't spend the six million dollars this year, but will put them in the Bank or in some other business and let them earn interest for us, perhaps as much as one and a half to two million dollars in a five-year period. By that time, we will probably have to replace our poles and spend our money. Of course, it will have cost us something to make these 400,000 poles last longer, perhaps a dollar or two a piece, but it should not cost nearly as much as the money we will have saved by postponing their replacement. We, therefore, have a possibility of saving upwards of a million dollars and this represents only the saving on the poles that must be replaced in a single year. If we can manage to also postpone the replacement of the poles which must normally be removed the year following, and also the poles that would have to come out the year after that, and the next year, and so forth, we can imagine infinitely greater possibilities of saving, as years go on. Surely there is a great opportunity for us in this way to serve our employers and the Nation as a whole.

Undoubtedly, what I have said describes a pretty picture which is probably an ideal that we may never be able to attain. We cannot make it work out quite as nicely as that but let us look at it in another way. Out of a total plant of seven and one half millions of poles, we are now replacing approximately 400,000 a year, or roughly one out of every nineteen poles. This gives us an average life, for the poles, of about nineteen years. Suppose we should be able to make every one of these poles last an extra five years. This is a very conservative estimate and not an unreasonable figure. We would then have to replace each year only one out of every twenty-four poles. That would mean only 310,000 per year instead of 400,000 a reduction of 90,000 in our yearly requirements. This would result in a very definite saving of $1,350,000 a year, if we use the same basis of figuring as heretofore. This would not be all profit, as it would cost something to secure the increased life, but certainly a nice portion of it would be realized.

All this preliminary discussion has been given to you for no other purpose than to build up a background in your minds against which wood preservation will stand out as a matter that everyone of us should take seriously. When we consider the growing scarcity of pole line timber, the constantly increasing costs of such timber, and the increasing demand for stronger and more dependable lines, we cannot help but lend our influence and our efforts toward doing all we can to care for the poles which we already have, as well as those which we will be adding to our plants, in the years to come.

The subject of wood preservation has been presented to you in many ways before this and you already have a Sub-Committee specially assigned to wood preserving problems. I, therefore, shall not burden you with once more describing the theory

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wood preservation, or with detail descriptions treating processes. I shall however, endeavor to you what the Western Union has done and doing in this direction, and I hope something my story may be helpful to some of you.

First, we shall consider the matter of the new es which are going to be put into our plants. ese we will divide into two classes —first, those bers which, without treatment, decay so rapidly to make them entirely unsuited for pole usage, l second, those which have natural resistance decay and will last a considerable period of rs even when untreated.

The first group, at the present time, includes ncipally the Southern Pines. This timber, if treated, will ordinarily last only a few years. rthermore, it decays not only at the ground line, t above, so that to make it suitable for pole usage, must be treated its entire length, from top to ttom. In consequence, pine poles are always essure treated in closed retorts. The process a familiar one and need not be described here. hen efficiently performed, this treatment results a pole so durable and generally satisfactory that eosoted pine poles are now being used by many ilities in numerous parts of the Country. These les are apt to be more expensive in first cost an poles of other timber, on account of the cost the treating operations and the cost of the creote oil consumed but past experience has shown em generally to have a long and very satisfactory e.

So far, pressure treatments have not been applied tensively to other kinds of poles than pine, but may be expected that the future need for poles ll result in the treatment and use of numerous rieties of timber that are now considered unitable for pole usage. Already pressure treated poles are being used to a limited extent on the acific Coast and consideration has been given by rious interests to the possibilities of making marack, lodge pole pine, fire-killed pine, etc., suitle for pole use, by means of pressure treating.

The second group of pole materials that we ve available includes such timbers as redwood, e various eastern, northern and western cedars, estnut, and cypress. With the exception of press, all of these timbers are very durable above round and last fairly well, even at the ground ne. Cypress makes a very long lived pole after e sapwood has gone, but the sap is relatively ick and usually splits off the heartwood from top butt within a few years after the pole is set. Whether the future will see a method developed f overcoming this fault is problematical. In the ase of the other timbers named, however, replacement is most always due to decay at the ground ne. If this local area can be made more durable, e pole life can be lengthened considerably.

The cheapest and consequently one of the most idely used methods of delaying ground line decay s to paint the ground line section of the pole with creosote oil, or some other similar preservative agent. Experience has shown that this treatment can be made to be effective and economical. However, if it is not done right and under proper conditions, it is very likely to be a failure. For quite a number of years, the Western Union treated poles extensively when they were being set, by painting the butts with creosote. Ultimately after considerable inquiry and investigation, it was found that there were so many cases in which the treatments did not prove effective that the practice of applying brush treatments generally could not be justified under existing conditions. The fundamental reason for these unsatisfactory results appeared to be that the treating work was done by the regular construction forces along with their regular work, without sufficient specialized instruction being given to insure that the treating was done in the proper way and at the proper time. The direct cause of failure were principally, first, that the treatments were often applied to poles which were wet or unseasoned; second, they were applied during cold and wet weather; third, the oil was not kept hot enough or applied in sufficient quantity, and fourth, the wood subsequently checked through the treated layer, exposing the inner untreated wood to decay.

Brush treatments having thus been proven to be of questionable value, unless extensively supervised to make sure that they were applied thoroughly and only under favorable conditions, attention began to be given to the advantages of tank treatments applied to poles before they were shipped out on a job. The basis of practically all such treatments as applied to poles like the cedars, chestnuts, etc., consists in boiling out the butt section of the pole in hot creosote long enough to thoroughly heat the wood and drive out the sap and moisture, and then allowing the pole butt to stand in cold oil until the pole has cooled and capillary attraction, added by the contraction of the wood cells, air and vapor in the pole, has caused the maximum amount of creosote to penetrate into the wood.

Some experience has already been gained by the Telegraph Company with this method of pole preservation. Starting in 1916, a small circular tank, 8 feet in diameter and 8 feet deep, had been set up in Greensboro, N. C., for treating chestnut poles. With oil in the tank, poles were placed in it in the morning and a fire maintained underneath until the temperature had reached approximately 212° F. After keeping this temperature a couple of hours, the fire was drawn and the oil allowed to cool. The next morning the poles were removed, another charge put in and the treatment repeated. There was no pumping equipment and the creosote remained in the tank all of the time. This tank was moved to various points in the Southern States and by 1920, had been the means of treating close to 5,000 poles.

In 1919, a second treating tank, this time 9 feet in diameter, was set up in Chattanooga, where the

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Telegraph Company at that time had a small pole yard. Treatments were conducted here just as described above, except that difficulty in getting the oil to cool below 150° F. made it necessary to provide an electrically driven pump and an extra tank for storing cold oil. By pumping the hot oil off the top of the treating tank to the storage tank and running cold oil into the bottom of the treating tank, it was possible to set up a circulation which soon brought the temperature down to the desired level.

By this time, the desirability of tank treating a larger percentage of the new poles annually set in our lines had become so obvious that subsequent developments in pole treating came fast. First, in 1920, a new plant with larger and more complete equipment was built in Chattanooga to replace the old 9 foot tank. This Plant had a 35 H. P. vertical boiler for heating purposes, two 7 foot by 9 foot oval treating tanks, both hot and cold oil storage tanks, and an electrically driven pump, and was designed to treat from 25,000 to 35,000 poles a year. Pole handling operations were carried on at first by one locomotive crane, a second crane being added later.

Next, in 1922, another and larger plant was built in Brisbane, Ill., where a large pole yard was established for storing and sorting poles, as well as treating. This Plant was laid out very differently from the Chattanooga Plant, and was planned to treat at least 60,000 poles a year.

Even the addition of the Brisbane Plant, however, did not make it possible to completely satisfy the demand for poles, so in 1923 the Plant at Chattanooga was once more rebuilt and its capacity doubled. Finally, in this present year, 1924, a third plant has been built at Nashua, N. H., and has just been placed in operation. Each of the three plants exhibit characteristics quite different from the others, so a brief description of them will not be out of the way.

We will first consider the Chattanooga Plant, which was the first one and has been twice rebuilt. It comprises about 3,000 feet of pole storage track, with ample switching facilities, and has two traveling cranes for handling poles and cars. Concentrated close to the center of the plant is the boiler house, housing an 80 H. P. boiler; next to this are a 20,000 gallon cold storage tank and a 6,000 gallon hot storage tank, together with several auxiliary tanks that were inherited from the previous plant.

Four rectangular treating tanks, each 7 foot by 12 foot in size, are located at the four corners of a rectangle, and connected with the same by oil and steam pipes. Each tank has its own motor-driven 300 gallon-per-minute centrifugal pump, located, together with associated piping and valves, in a waterproof pit close to the tank, and used for pumping oil back to the storage tanks. The location of the treating tanks at widely separated points, as in the Chattanooga Plant, was planned so as to have each tank at the center of a pole storage area from which it could be served with poles with a maximum track travel on the part of the locomotive crane, and so that pole handling operations coul be carried on at any of the tanks without interferin with similar operations being carried on at one o more of the other tanks. The principal disadvan tage of this arrangement is that the steam for hea ing purposes must be piped quite a distance and tha oil handling and circulating is necessarily slow o account of the long lengths of pipe which the o must traverse.

In the operation of the Plant each pole, befo being removed from the bin, is equipped with small individual sling at its top. Then when read for transfer to the treating tanks, a number of thes slings are looped over the crane load hook and a many as six to a dozen poles, depending on siz swing at one time to the treating tank. The pre vious attachment of these individual slings avoid holding up the crane while hooking on to poles, an also permits a bundle of poles to bunch together s closely that comparatively large numbers can b easily put into the tank at a time. It might be men tioned that these slings, which are of ⅜ inch wir rope about 10 feet long, are equipped with speciall designed rings and hooks in which the rope socket are integral with the rings or hooks and the hook so shaped as to permit being pulled out from under neath poles with ease and a minimum of catching As soon as the poles are in place, the individua slings are removed and large slings, each encirclin a group of poles, put on for use in subsequent un loading. When the poles are removed from th tanks, they are either loaded directly on to cars o storage bins, or laid temporarily to one side so tha reloading of the tanks may start with the least pos sible delay.

In all of the treatments, it is customary to leav the poles in hot oil from four to eight hours, de pending on the condition of seasoning, and then change the hot oil to cold oil without lowering th level of oil or exposing the treated area of the pole to the air. This is done by pumping hot oil off th top of the tank and running cold oil in at the bot tom, just fast enough to keep the oil level constant The cold oil bath usually lasts a minimum of hal an hour, after the bottom temperature has bee reached.

At the present time, the Chattanooga yard i stocking approximately 60,000 chestnut poles an the output of treated poles is at the rate of abou 85,000 poles per year.

At Brisbane, Ill., we find a very different type of plant, all treating equipment is concentrated at one point. The Plant looking westward toward the treating tanks, contains about 5,600 feet of pole storage track. Close to the boiler house, which houses a 125 H. P. Scotch Marine boiler, are the storage tanks one 30,000 gallon cold storage tank one 20,000 gallon hot storage tank and one 10,000 gallon auxiliary storage tank. Next to the storage tanks are two treating tanks, each 10 foot x 20 foot in size. In between the storage and treating tanks, and mostly below ground, lies the pump room hous-

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ing all control valves and instruments, and also two 800 gallon-per-minute, motor-driven, centrifugal pumps having a pumping capacity, when operated together, of approximately 1,500 gallons per minute The principal oil piping is either 8 or 10 inches in diameter. Both the steel treating tanks and the pumping equipment are housed in a concrete pit, the tanks being insulated from each other and from the pit walls and pump room.

Not far from the treating tanks is a stationary, full revolving, guyed derrick, having a 100 foot boom and a 115 foot mast, mounted on a 12 foot concrete pedestal. This derrick can handle poles over a large storage area and not only serves both treating tanks, but also can load and unload poles to or from cars, on both sides of the treating tanks. Two auxiliary locomotive cranes are used in pole handling operations, both at the tanks and in other portions of the yard. The pole skids on which the shaving of cedar poles is done, are located within the derrick area.

It will be noted that at Brisbane, all treating equipment is concentrated at one point, as distinguished from the widely separated units at Chattanooga. This layout was chosen partly to secure what seemed to be the greatest efficiency in treating and pole handling operations, and partly to make the entire equipment available for treating either chestnut or cedar poles. As the latter must be carefully shaved before treatment, ample shaving skids must be located in reasonable proximity to the treating tanks.

The general operation of the Brisbane Plant is much the same as at Chattanooga, except that due to the larger size of the tanks, the time devoted to changing oil and loading poles into and out of the tanks has a greater effect on the efficient running of the plant. The oil changes at Brisbane are, therefore, made very quickly, thanks to the large capacity of the oil pumps (1,500 gallons per minute). The time devoted to unloading of poles is also usually cut down as much as possible, by simply laying the poles down in temporary piles as fast as they are taken from the treating tanks. Of course, relatively large lots can be handled at a time, because the practical limit of the derrick is really the number of poles which can be conveniently and safely bunched together.

The Brisbane Yard is used for storing both cedar and chestnut poles, and usually has a small stock of pressure treated pine poles to meet special demands. The cedar poles are stocked in the south side of the yard, and are carried by the crane to the shaving skids, where they are shaved and then handled by the derrick into the treating tanks. The chestnut poles are stored on the north side of the yard and are carried to the treating tanks by either the derrick or a locomotive crane, depending on whether they have been stored within the derrick area or not. Close to 110,000 poles are at the present time stocked in the Brisbane Yard. Both cedars and chestnuts are being treated, the present output of treated poles being at a rate of approximately 125,000 a year, or practically double that for which the plant was designed.

The latest plant, at Nashua, N. H., is a compromise in plan between those at Chattanooga and Brisbane. The pole yard and tracks were already in existence when it was decided to install this treating plant, and consequently the treating facilities had to be planned to suit the existing layout. The plant has a central boiler house, housing an 80 H. P. Scotch Marine Boiler, and two treating units located at a distance from the boiler, just as at Chattanooga. The treating tanks are also of the smaller size, each being 8 ft. by 12 ft. in size.

In other respects, each unit is a complete treating plant in itself, except that its steam for heating purposes comes from the central boiler. At the eastern unit there are two treating tanks, together with one 30,000 gallon cold storage tank and one 9,000 gallon hot storage tank. A 600 gallon-per-minute motor driven pump, together with associated valves and piping, mostly 5 and 6 inches in size, are located in a concrete pit between the two tanks. The western unit is similar except that it consists of but one treating tank, and the oil storage tanks are smaller, being but 20,000 gallon capacity for the cold tank and 4,700 for the hot one. The Nashua Yard comprises about 2,600 feet of pole storage track and at present stocks from 50,000 to 60,000 cedar and chestnut poles. Treating operations have only recently begun, but the capacity of the plant is sufficient to reasonably turn out treatments at a rate of close to 60,000 per year.

(To be continued)

A Book About Success

F. E. d'Humy has written a book about SUCCESS which should be read by every telegraph, telephone and railroad official and employee.

The author has long been a student of the circumstances and forces which are related to personal progress and in this new book he has presented a concept of the subject which enables any one who can read to gain new footholds along the path of life.

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W. S. Brewer of 80 Watts Street, New York, in renewing his subscription writes: "For forty-one years I have been enjoying the news and views and progress of the craft through the Age. Congratulations on the improvements you have made. May you live long to continue your valuable paper for all of us and those to come."

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The Gulstad Relay

DURING the past two years the practice circuits in the London Training School have, one by one, changed over from Recorder to Morse working. This follows upon similar changes which have taken place and which will continue to take place on cable circuits.

The Recorder code with its dot and dash signals of equal time value is at first sight preferable to the Morse code in which the dash is three times as long as a dot. Nevertheless, it has been found advantageous to revert to Morse working on cables, largely owing to the manner in which the Gulstad relay operates.

In Morse working, signals are sent by means of a divided lever, spaces with, say, negative current to line, and dots and dashes with positive currents to line. The periodic time of a dash is three times as great as that for a dot. It will be remembered that a certain definite time elapses before the current at the receiving end of a cable reaches a steady value, and that a brief impulse will result in a weaker received signal than a longer impulse. Fig. 1. (*a*) shows the word "Paris" as received at

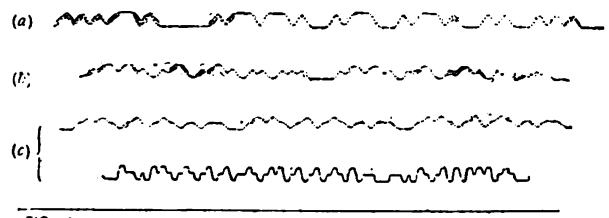

FIG 1.

the end of a cable worked at slow auto speed. The current is positive during dots and dashes, and negative during spaces. The time of contact for a dot is sufficient to allow the received current to grow to a value equal to that for a dash. A P. O. relay in circuit will faithfully relay these signals providing their amplitude is sufficient to operate it Fig. 1. (*b*) shows the same word as received at a higher speed. The time of contact for a dot and for a space element is now not long enough to allow the current for a dot to grow to the same value as for a dash. It will be remembered that the current through a P. O. relay (no bias) must reach a certain definite positive value before the tongue is drawn over to the marking side, and an equal negative value before it is drawn back to the spacing side. We may assume that each of the signals of Fig. 1. (*b*) is able to operate the relay. Fig. 1. (*c*) shows the signals at a still higher speed. At this new speed the duration of contact for a dot is so short that the current only has time to decline to zero. Similarly the current for the space between elements of a letter signal only declines to zero and never reaches a negative value. An ordinary relay will obviously fail to forward these signals as neither the dots nor the space between the elements of a letter reach a value sufficient to operate it.

The relay invented by Konrad Gulstad, of the Great Northern Telegraph Company, enables such signals to be successfully relayed. The relay is similar to a P.O. relay, with the addition of an auxiliary circuit joined up as in Fig. II.

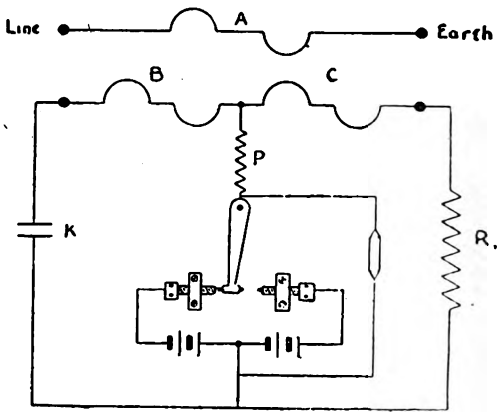

FIG. 2

The three coils, A, B, and C are wound on the same soft iron cores. A is the main coil, B is the "pull-on" coil, and C is the "pull-off" coil. The function of the currents in the local circuit is to supply the energy for moving the tongue, while the functions of the signalling currents in the main coil is solely to control the movements of the tongue.

Consider what occurs when no current is flowing in the main coil. Let the tongue rest at some moment on S. The left half of the split battery is joined to the junction of B. and C, A transient current is set up through B to charge K, this current being in such a direction as to press the tongue more firmly against S. On account of the capacity in this branch this current leads in phase with respect to the current in the parallel circuit through the "pull-off" coil. The current through C grows slowly and is in a direction tending to pull off the tongue. After a fraction of a second the effect of the latter current overbalances the effect of the decaying transient current, and the tongue is drawn away from the contact. The condenser thereupon discharges through both coils in series in the pull-off direction. The tongue is thus deflected to the marking side with considerable force.

A similar series of operations in reversed directions now occurs, and the tongue is then restored to space. This cycle is then repeated, so that in the absence of any current in the main coils the tongue oscillates steadily from side to side. The rate of vibration may be adjusted by means of P, K, or R., the last-named being chiefly used for this purpose.

If a P.O. relay or recorder is joined between the tongue and the split of the battery, then these oscillations will cause reversals (dots) to be made in this leak circuit. Thus dots will be rewarded when the line circuit is not joined up, or when no current is flowing in the line.

Signals from the line circuit are "shaped" by means of an inductance in parallel with the main

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winding, or by a shunted condenser in series with it or by both of these devices. The crests and troughs of all signals will be parallel to the zero line when these shaping devices are correctly adjusted. When signals are flowing through the main winding and the local circuits are in proper adjustment, then during the period of zero current for one or more dots the tongue will vibrate owing to the local currents and will interpolate the correct number of dots. The magnetic effect of the full marking current (dash) and of the full spacing current (space between letters) will be in each case sufficient to control the movements of the tongue. If the local break-away current is too strong, then split dashes and extra dots will be received, the remedy then being to reduce the final value of the break-away current by increasing P.

The great advantage of the Gulstad relay is that it enables the speed of working with Morse to be increased to the point at which a contact for a dot is so brief that the received current has time only to die away from spacing to zero. At this speed the received current for dots is nil. The speed cannot be increased beyond the point at which a T or an equal spacing signal do not reach the full marking or spacing values.

Facts About Electricity

INTERNAL RESISTANCE OF BATTERY.—Put the battery in circuit with a sine or tangent galvanometer. Note the deflection. Halve the deflection by introducing resistance. The resistance introduced is equal to the original resistance—that of the battery and the galvanometer-coil. Deduct the latter and you have the desired result.

MEASUREMENT OF ELECTROMOTIVE FORCE BY COMPARISON.—(Clark.)—When a number of cells are joined up in circuit with, but in opposition to, a number of other cells, with a galvanometer inserted, by adjusting the number of cells so that no current passes, the relative electromotive force of the two batteries may be determined. Or, call the electromotive forces of the two batteries E and E'; join them up successively in circuit with the same galvanometer, and by varying the resistance cause them both to give the same deflection; their forces will then be in direct proportion to the total resistances in circuit in each case, or,

$$E' = E \times \frac{R'}{R}$$

When R represents the resistance with E (including that of battery, galvanometer, and the adjustable resistance) and R' and E'.

MEASUREMENT OF INSULATION.—This can only be done satisfactorily when the insulation is equal at all points; that is, when there are no especially bad leaks on the line.

Open the line at the distant end. All the deflection you now get is caused by the escape of current from the wire over the insulator. The amount, mutiplied by the number of miles, gives the mileage insulation, and this by the number of poles per mile, the average resistance per insulator.

TESTING FOR INSULATION OVER TWO LINES.—(Haskins.)—Suppose you wish to test the insulation of a wire which is, say, 50 miles away. You may connect it in circuit with a line of better, or worse, condition, running from your location, and arrive at the measurement of the farther line as follows:

First, measure the connecting line, open at the junction. Reduce this insulation to mileage resistance. Then connect both lines, open the farther one at the distant end, and measure both for insulation. Reduce this also to miles. If the first line is worse, the average per mile in the second test will be better than in the first, because the better average of the second lines has made the whole line show better. This excess belongs to the second line and must be added to it. Divide the excess per mile by the number of miles of the first wire, and add this to the second measurement. The result will give the correct insulation resistance of the second wire. If the first wire is the best, the process must be reversed.

EXAMPLE.—Suppose you wish to measure a line 100 miles long, and a rainy day, and it is 25 miles from you. You measure the wire from you to the other wire, and find it gives an insulation of 900,000 to the mile. Now connect to the other, and you get for the 125 miles a mileage insulation of 1,000,000. You have just seen that the first 25 miles measured only 900,000. You have, therefore, 100,000 per mile on the 25 miles that clearly belongs on the 100 miles.

$$\frac{100{,}000}{25} = 4000,$$

and the 100 miles having 1,000,000 each, we divide that also, making 10,000, and,

$$10{,}000 + 4000 = 14{,}000 \times 100 = 1{,}400{,}000.$$

Thus we see that the insulation of the 25 miles is 900,000 per mile, while the last 100 miles is 1,400,000 per mile.

SECOND METHOD.—The following was used by Varley on the Western Union lines, for determing the insulation resistance of two portions of the same wire.

1

A.....B

x x a y

Tested from the terminal A.

The portion of line x, x (from A to a), is worse than y (from a to B). Required to find what, measuring from A, would be the insulation resistance y, if tested from a.

2x = first section of line.
y = unknown resistance at a.
1 = insulation resistance of 2x.
R = insulation resistance when open at a.

Therefore,

$$R - x = 1,$$

R' = insulation resistance when open at B, and

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$$R' = x + \frac{1\,(x + y)}{1 + x + y}$$

and,

$$y = \frac{(R - x)\,1}{R - R'} - - x.$$

TESTING FOR CONDUCTIVITY.—First, test with line open at distant end, for if there is a heavy escape on the line your resistance will show less than it really is. Then close the wire, and the result will be the entire resistance of the wire, and instruments (if they are in circuit). To test the wire carefully, the relays should all be cut out. The total resistance, divided by the number of miles, gives the wire resistance per mile.

LINE RESISTANCE MEASURED FROM AN INTERMEDIATE STATION.—The late F. L. Pope gives the following ingenious method of measurement with the Bradley Tangent, putting it into circuit anywhere on the line. Any good tangent could be used in the same manner:

"Connect the main circuit so that it will pass through I. and II. of the rheostat, and through the No. 1 coil of the galvanometer. When the circuit is closed for a few seconds take a reading of the deflection perhaps one-half (1,000 or 2,000 ohms will usually answer), and take a second reading. It is well to reverse the connections and repeat the two observations, and take the mean result of the two deflections. The following example will serve to show how the result is worked out:—

"'Suppose the deflection obtained on No. 1 coil in the main circuit is 61° (tan. 1.804), and by inserting 2,000 ohms it is reduced to 42° (Tan. .900.) If we call the unknown resistance x we have,

x : x + 2000 : : .900 (tan. 42°) : 1.804 (Tan. 61°).

Converting this into an equation and reducing,

$$.904\ x = 1800000$$

$$1991.'$$

"Or (to avoid equations,) substract the tan. of 42° (.900) from tan. 61° (1.804) and we have .904 for the equivalent tan. for the 2000 ohms inserted. Now,

"Tan. .904 : 2000 ohms : : tan. .900 : 1991 ohms.

"The resistance of all relays in the line are, of course, to be subtracted"—Haskin's Galvanometer.

Telegraphers of Today

WE find that we have on hand quite a number of copies of "Telegraphers of Today," which is a book made up of 354 pages, printed on heavy coated paper measuring eleven inches wide by fourteen inches in height. This large book contains over a thousand sketches of telegraph people, together with a biography of their lives. It is a splendid work and was printed in 1894. It is used extensively in the libraries of prominent telegraph and railroad people. While these books last, we will sell them at $5.00 each and we will prepay the carrying charges. Address and make remittances to Telegraph and Telephone Age, 253 Broadway, New York.

The Italian Cable

"BY establishing direct cable connection between the United States and Italy," Mr. Carlton said, "we are providing facilities for speedier and cheaper communication with all that section of Eastern and Southern Europe which was formerly the Austrian Empire, as well as with Italy and Spain. The new cable will also connect at Horta in the Azores with a cable which will shortly be laid from that point to Emden in Germany, thus re-establishing direct cable communication with Germany, which has been broken off since the war.

"The Western Electric Company had developed in its laboratories a method of loading submarine cables by surrounding the copper conductor or core with a new magnetic alloy of nickel and iron discovered by them and known as permalloy.

"Their experiments indicated that the inductance set up by the use of this new metal would overcome in large part the handicaps of the high speed cable transmission which are inherent in the nature of the submarine cable itself."

The inauguration of the cable was made the occasion of a congratulatory ceremony at Rockaway Beach, Long Island, where the cable is to start. Besides representatives of the companies concerned in the development and operation of the new type of cable, there were present representatives of the Italian government, a number of electrical engineers, among whom this first application of permalloy has attracted much attention, and several members of the family, descendants or relatives of Cyrus W. Field, the American cable pioneer, to whose vision and persistence the establishment of telegraph communication across the Atlantic was originally due.

Meeting of the Institute of Radio Engineers

THE first meeting of the Institute of Radio Engineers for the winter season 1924-25 will be held on the evening of Wednesday, October 1, at 8:15 o'clock, in the Engineering Societies Building, 29 West 39th Street, New York City.

A paper on "Radio Direction Finding" by H. deA. Donisthorpe of the Marconi International Marine Communication Company, Ltd., will be presented. This important aid to navigation will be discussed from the practical point of view. All members of the Institute and their friends are cordially invited to attend.

The Chateau Frontenac

The extensive pneumatic tube installation in the Chateau Frontenac, Quebec, where the convention of the Telegraph and Telephone Section of the American Railway Association, is to meet in September, was manufactured and installed by the Pneumatic Tube Supply Company, Plainfield, N. J.

If you see it in Telegraph and Telephone Age you know that it is so.

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Sarnoff, Back from Europe, Backs Long Waves for High Power Radio

STATEMENT FOLLOWS PERSONAL INVESTIGATION OF SHORT WAVE DEVELOPMENTS BY EUROPEAN SCIENTISTS.

INTRODUCES SUPER POWER BROADCASTING IDEA IN ENGLAND, FRANCE, AND GERMANY

JUST returned from Europe where he remained seven weeks visiting the leading radio engineers and scientists in governmental and private radio circles abroad, David Sarnoff, Vice-President and General Manager of the Radio Corporation of America, is still a champion of long wavelength for trans-oceanic radio communication after making a thorough analysis of the developments which have gone forward in short waves in Europe, under Governmental and private supervision and initiative.

"I have nothing, as yet, in this new field of short waves either in Europe or at home, "said Mr. Sarnoff," which justifies the claim that the present high-power long wave stations employed for commercial trans-oceanic communication will be supplemented by the low power stations. Reliable radio transmission over long distances during the daylight and business hours, must still be conducted with high-power and long waves, such, for example, as we are now using at Radio Central, on Long Island, N. Y. The possibilities of radio development in all branches of the art, however, are too great and promising to permit any negative views that its advance will stop here or there."

STUDIES MARCONI'S SHORT WAVE EXPERIMENTS.

"While in England, I saw a good deal of Mr. Marconi and his experiments with short waves. These experiments have given fresh impetus to the work of research men and radio engineers in the United States, where the short-wave field has been under scientific investigation for several years. It may be confidently expected that the use of short-waves will immeasurably and in a practical way advance the art of radio communication in the field of wireless telegraphy as well as wireless telephony."

"To my mind, one of the greatest advantages which will result from experiments now being conducted with short-waves, is the increased knowledge we shall gain of the behavior of different wavelengths in the conducting medium between the sending and receiving stations. Much has already been accomplished in perfecting the radio sending and receiving instruments; but more still remains to be learned about what actually occurs to the electro-magnetic waves in the space which separates the receiver from the transmitter. As we learn more about Nature's secrets, now hiding in the great outdoors, we shall come nearer our goal of completely eliminating static, interference, fading and other scientific problems still requiring solution."

U. S. BROADCASTING FAR SUPERIOR TO EUROPEAN.

"I investigated the broadcasting systems of England, France and Germany, and met the principal persons both in Governmental and private circles, responsible for the development of radio in Europe. My conclusions are, that broadcasting, which was initiated in our own country, has advanced in the United States, both as a Public Service, and as an industry, to so great an extent as to make comparisons with European Countries almost impossible. In France it is just beginning, and in Germany it has hardly begun. In England greater progress has been made than in other European countries. About 800,000 Government Licenses have been issued permitting British listeners to receive programs from the air. But even in England, broadcasting cannot be said to compare favorably with the United States, either as to quality or variety of programs, or as to effectiveness, simplicity, or small cost of receiving apparatus, manufactured and sold for home use."

"Nor is there to be found abroad the same freedom from censorship and restriction which exists here. For example, in England, where freedom of speech has been such a heralded tradition, political broadcasting is forbidden over the radio stations, which are all controlled by the British Post Office. In other European Countries, Governmental regulations and restrictions are even more severe, and these, in a large measure restrict and retard the growth of the broadcasting art in Europe, and at the same time deprive their listening public of the freedom, enjoyment, and instructive information available to all in the United States."

"I endeavored to interest the British, French and German broadcasters in the idea of increasing the power of their sending stations, so that the programs of London, Paris and Berlin might be easily heard by the American listening public. At the same time I suggested the possibility of American stations sending over their programs, which could be regularly heard abroad. Much interest was shown in these proposals, and I believe that an era of trans-oceanic broadcasting is near at hand. Realization of such a plan, would greatly enchance the value of broadcasting to the public on this side as well as on the other side of the Atlantic Ocean, and help to bring the old and the new world a little closer together."

Telegraph and Telephone Life Insurance Association

ASSESSMENT Nos. 834, 835, 836 and 837 have been levied by the Telegraph and Telephone Life Insurance Association, New York, to meet the claims arising from the deaths of William L. Nichols, aged sixty-four years, Bolivar, N. Y.; Amos D. Taylor, seventy-four, New York,; Joseph Frankl, seventy-seven, San Francisco, California, and George M. Reynolds, seventy-eight, Chicago.

Plena Gratia

Madge: "Would you marry a man to reform him?"

Mabel: "I suppose I shall have to—there isn't one of them that suits me the way he is now."

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A Few Hints Regarding the Adjustment of Telegraph Apparatus

If operators in general could be made to realize how much more comfort they might take in their daily work did they but acquire even a slight knowledge of the knack of adjusting their instruments properly, they would certainly make a move in that direction for their own interest if not for that of the company employing them.

There is positively no excuse for the indistinct manner in which signals are so frequently recorded on the instruments. When the signals do not arrive in proper shape there is some good reason for it, but the theory of the fault given by the average operator is usually wide of the mark, and as he adjusts in accordance with his ideas of the trouble he frequently makes matters worse by such efforts.

For the purpose of demonstration let us see what may be learned in the way of adjustment and care of an ordinary single line relay and sounder. Now, we will assume that the wire, battery, and instrument coils are in first-class order and then introduce a few conditions for the purpose of noting the different effects produced on the apparatus.

WET WEATHER EFFECTS

In wet weather the amount of current which flows through the coils of a relay is greatly increased at or near the battery station over and above that which normally flows in clear weather, while distant station instruments receive less than the usual amount. This condition is caused by the numerous "escapes" or side paths down the poles along the route which draw additional current, all of which must necessarily pass through the relays inserted between them and the battery. Distant relays receive less than they are entitled to because much of the current on the wire "escapes" down the wet poles before reaching them. Now, a strong current in the coils means a strong magnetic pull on the relay armature, while a weak current, of course, causes a correspondingly weak attraction.

It follows from this that the wet weather method of adjusting a distant relay is directly opposite to that followed for the home relay at the battery end of the circuit. The operators at distant points must get the magnets closer and closer to the armature as the downfall of rain increases, while the home operator is compelled to draw his relay coils away from it. This seems like a very simple operation to perform, but the manner in which most operators go about it explains why they fail to secure the best results.

Now, the first principle of adjustment lies in maintaining at all times, whether the current is weak or strong, a practically constant or normal tension of the retractile spring attached to the relay armature. The explanation is that a relay spring responds best to the magnetic attraction of the armature when the tension is such that the "curling" is not stretched to any great extent out of its original close-fitting construction.

The adjustment should invariably be done by moving the magnet backward or forward by mea of the thumbscrew. The tension of the retract spring need not be altered preceptibly except give the operation a finishing touch. The habit stretching the relay spring to meet a strong ma netic pull not only causes the spring to work le efficiently at the time, but soon injures it perm nently by destroying its sensitiveness.

"FEELING" FOR A DISTANT STATION

It frequently happens in very wet weather th a distant office cannot break the operator at or ne the battery station on account of the difficulty th later has in getting a fine adjustment. When i formed by way of some other circuit that such i the case the best method to pursue is as follows Make a few dots to attract his attention (he wi hear you; the distant office has the advantage i this respect) and then tell him to "dot." Now pu the magnets back from the relay armature until th circuit stands apparently just open. Next tur down the retractile spring very slowly until yo hear the signals. If you miss them you may some times catch them by placing your finger on the leve of the relay and giving it a gentle pressure back and forth. If the operator is dotting you will feel the impulses and thus be able to readjust the instrument.

The latter method is an excellent one to pursue on a way wire when in doubt as to whether any one is using the circuit, for, by this precaution, one operator need never break in while another is sending. However, as it is only in very wet weather that an operator is bothered to any great extent by the relay, the real source of the annoyance usually lies in an improper adjustment of the sounder.

ADJUSTMENT OF THE SOUNDERS.

When a sounder does not give out a loud enough tone to suit an operator, he almost invariably proceeds to give the lever a wider play, as if that was the only remedy. As a matter of fact that process in itself seldom brings about the desired results unless the lever at the time happens to be screwed down abnormally close. The important thing to know is that if you give the lever a play which will permit the armature to move away from the magnet cores beyond a normal distance, the magnet has a hard time getting control of it again. The explanation is that a magnet loses its power to attract the armature in a degree directly proportional to the square of the distance separating them; or, in other words, to the square of the air gap. For example: If two magnets similarly constructed in all respects be fed by an equal strength of current and the air gap between the cores and the armature of one equals the thickness of a cardboard, while two cards could occupy the gap of the second magnet, the former would be practically four times as strong as the latter. It is plain, therefore, that to give the sounder level too great a play will so weaken the pull on the armature when in its "open" position that when the local circuit is again closed the lever moves so slowly at first that it hardly has time to cross over the space before the current is

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again broken. The result is that a signal is partially broken up before completion.

The lesson to be learned from this is that the play given to an armature lever must never be so great that the magnet cannot bring it back promptly within the time allotted to complete a signal. This, in turn, suggests that the amount of play should be decreased in proportion to the speed with which the signals are increased.

(To be Continued)

New Cable

THE American shore end of an entirely new type of submarine cable, which will transmit signals at several times the speed of any long cable now in existence and which will utilize important new discoveries in electrical science, was landed at Rockaway Beach, Long Island, N. Y., on September 2nd, by the Western Union Telegraph Company.

The new cable is not only an electrical innovation of the first importance, but will be the first direct cable from the United States to Southern Europe. It runs from New York to the Azores and thence will be extended to Rome by way of Malaga, Spain.

"This new invention assures the supremacy of the cable in trans-Atlantic communication," said Newcomb Carlton, President of the Western Union Telegraph Company. "The first radical improvements in cable construction since Cyrus Field connected the continents in 1858 are embodied in the new cable. By means of the method of 'loading' the cable developed by the Western Electric Company and now applied for the first time, we shall be able to transmit messages at a speed from five to eight times as great as the highest speed now attained in standard cable practice.

"By establishing direct cable connection between the United States and Italy, we are providing facilities for speedier and cheaper communication with all that section of Eastern and Southern Europe which was formerly the Austrian Empire, as well as with Italy and Spain. As Europe's economic condition becomes stabilized, there should develop a larger and important commerce between the United States and that part of Europe, which the direct cable will facilitate.

"The new cable will also connect at Horta in the Azores with a cable which will shortly be laid from that point to Emden in Germany, thus reestablishing direct cable communication with Germany which has been broken off since the war.

"This new cable, therefore, will serve practically all of Northern, Eastern and Southern Europe, with Rome and Emden as the gateways.

"The Western Electric Company had developed in its laboratories a method of loading submarine cables by surrounding the copper conductor or core with a new magnetic alloy of nickel and iron, discovered by them and known as permalloy. Their experiments indicated that the inductance set up by the use of this new metal would overcome in large part the handicaps of the high speed cable transmission which are inherent in the nature of the submarine cable itself."

The economic advantages of this naturally interested us. Before ordering the new cable, however, we had an experimental length of 120 miles made under the direction of Western Electric engineers and subjected it to a long and severe deep water test off the coast of Bermuda. This test indicated that we could expect a long cable constructed in the same manner to transmit messages at a speed of above 1,500 letters per minute. The highest speed of legible signals heretofore obtained by any long cable is not much more than 300 letters per minute; the Western Union Telegraph Company has only two long cables capable of a speed above 250 letters a minute.

"The new cable's speed will be so high that the existing apparatus for receiving messages would be inadequate. New apparatus for this purpose, embodying the use of the familiar electron vacuum tubes for amplifying the electrical impulses, has been invented and built by the Western Electric Company for use in connection with the new cable. When the new cable is in full operation, it will require six automatic printing machines to record the messages received at either end.

"While the speed and efficiency of ocean cables has been multiplied many times in the sixty-six years of cable history, the improvements have been in the methods of sending and receiving and the apparatus used for those purposes. There has been no essential change, except slight variations in size, in the construction of the cable itself, since the first cable was laid, until now. To spend several million dollars in making and laying a new type of cable involved a risk which no telegraph company heretofore has been willing to take. The results of the experiments with the permalloy-loaded cable, however, were so conclusive as to warrant the Western Union Telegraph Company in being the first cable operating company to avail itself of this new scientific discovery."

The cable will be laid on the ocean bed in a straight line from the Western Union's cable station at Hammels, Rockaway Beach, to Horta, on the Island of Fayal in the Azores, a distance of 2,360 sea miles. In cable affairs a mile is always the nautical mile of 6,087 feet. From Horta to Anzio on the coast of Italy, 36 miles from Rome, the eastern half of the New York-Rome cable will be laid by La Compagnia Italiana dei Cavi Telegrafic Sottomarini of Italy. This part of the cable will be in two sections, the first stretching from Horta to Malaga on the southern coast of Spain, a distance of 1,347 miles, and the second, from Malaga to Anzio, 997 miles. The total cable distance between New York and Rome is 4,704 sea miles or about 4,422 land miles. Only the part laid by the Western Union Telegraph Company from New York to the Azores, is of the new loaded type the section which the Western Union Telegraph Company will lay later from Horta to Emden will also be loaded with permalloy.

The electrical principle availed of to give the new cable its high speed of transmission of messages is the same as that involved in the "loading" of tele-

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phone lines for long distance work, first successfully applied in this country through the introduction of Pupin coils to long telephone circuits. These coils, creating a magnetic field through which the impulses over the wires pass, have the effect of preventing distortion of the electrical waves travelling through the conductor. Their application to telegraph cables, however, is mechanically impracticable, and immediately after the war the Western Electric Company began a series of researches in the Bell System Laboratories at 463 West Street, New York, to discover, if possible, a practical means of applying the loading principle to long distance submarine telegraphy.

In the search for magnetic materials which might be useful in the development of electrical apparatus, engineers of the Western Electric Company had discovered that nickel and iron combined under proper conditions in the proportion of about 80% nickel and 20% iron, formed an alloy which is the most highly magnetic substance yet discovered, having, when properly treated, more than 30 times the magnetic permeability of soft iron. That a cable conductor surrounded by this highly magnetic alloy would carry intelligible signals at a higher rate of speed than had previously been possible, is the theory upon which the cable research was begun. After more than three years of experiments, methods were found of fabricating and treating permalloy and of applying it to the cable conductor.

Electrical impulses travelling over the ordinary cable are distorted so that unless signals are sent very slowly, the "head" of each succeeding wave or impulse overtakes the "tail" of the impulse which preceded it, with the result that the signals arriving at the receiving end overlap and, even with the use of the most highly perfected and sensitive electrical apparatus, become indistinguishable when a comparatively low speed of sending is exceeded. The precise effect of the permalloy loading is to do away in large part with this distortion of the impulses, thus making it possible for one to follow the other much more closely than has ever been possible before in cable practice, and still be recognizable at the other end of the cable.

The permalloy is applied to the Western Union's new cable in the shape of a single ribbon or tape, six thousandths of an inch thick, one-eighth of an inch wide and a little more than ten thousand miles long. The permalloy tape is wrapped in a spiral around the central copper core or conductor of the cable, from one end to the other. The conductor consists of a single copper wire around which are wound spirally six copper tapes. The total diameter of the conductor and its wrapping of permalloy is just a fraction short of a fifth of an inch, considerably smaller than an ordinary lead pencil. The cable itself, except for the heavily armored shore ends, is about one inch in diameter, the thickness being made up by the gutta-percha insulation, protective wrappings of jute fibres and eighteen spirally wound galvanized steel sheathing wires. The new cable was manufactured for the Western Union Telegraph Company under the supervision of engineers of the Western Electric Company by the Telegraph Construction and Maintenance Company of Greenwich, England, the same company which made and laid the first successful Atlantic cable in 1866, and the largest makers of telegraph cables in the world. Manufacture of the cable was completed on August 27th and it was brought to New York by the cable ship Colonia, the largest vessel of its kind, owned and operated by the Telegraph Construction and Maintenance Company, which arrived in this port on Sunday, August 31st. Because the size and the draft of the Colonia prevent her from coming close in shore in the shallow waters off Rockaway Beach, several miles of the shore end of the cable were transferred from her tanks to the Western Union's cable repair ship Robert C. Clowry, from which it was landed and connected through a conduit to the instruments in the Western Union's cable station at Hammels. The section landed by the Clowry will be spliced with the main cable on board the Colonia, a few miles off shore. The paying out of the cable from New York to the Azores is expected to occupy about two weeks.

"The inauguration of a new era in the cable history was made the occasion of something of a congratulatory ceremony at Rockaway Beach. Besides representatives of the companies concerned in the development and operation of the new type of cable, there were present representives of the Italian government, a number of electrical engineers, among whom this first application of permalloy has attracted much attention, and several members of the family, descendants or relatives of Cyrus W. Field, the American cable pioneer to whose vision and persistence the establishment of telegraph communication across the Atlantic was originally due.

"The importance of the new cable from the viewpoint of international commerce was expressed by Willis H. Booth of the Guaranty Trust Company, President of the International Chamber of Commerce, who was among the invited guests.

"The inauguration by the Western Union Telegraph Company of direct cable communication between the United States and Italy is of the highest present and future importance," said Mr. Booth. "Every step which facilitates international communication is a step toward better international understandings and the extension of international commerce. At this time especially, the establishment of a short, direct, and therefore rapid, and by comparison inexpensive, means of interchanging business communications between this country and Southern and Eastern Europe, will be welcomed by everyone concerned with the problems of foreign trade. Italy has made long steps toward economic rehabilitation since the war and with the new cable establishing Rome as the gateway through which all of what was the Austrian Empire, and the countries lying south and east thereof, can most readily communicate with America, the facility thus afforded is certain to be availed of liberally for the promotion of better and broader relations between the United States and these countries.

"The great productive countries of Czechoslo-

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kia, Hungary, the Austrian Republic, Jugoslavia, oumania and all that vast hinterland of Eastern id Southern Europe, which have much to offer the nited States in trade possibilities, are making ibstantial, economic progress.

"Currency values have been stabilized in Austria id Hungary, and are subject to but slight fluctuaons in the other countries. Internal transport and ansportation to tide water are about back to the re-war basis.

"With all of these conditions favorable, they will oon be in an improved condition to both buy and ell, and of the resulting trade we should get our nare. The need of this commerce is appreciated s it makes a background for the permanent reabilitation of this entire area, which in turn means tability of government and buying power within ne people, and more and better customers for us."

Concession Terms for Buenos Aires-Montevideo Cable

THE Argentine Government has announced the ranting of a 50-year concession to the Compania tialani de Cavi Telegrafici Sottomarini to construct ne or more cables from Buenos Aires to Montevideo, Uruguay. The company has deposited 25,000 pesos (approximately $18,500) with the Argentine Government as an evidence of good faith and as a guaranty that it will follow the regulations prescribed.

The company must regulate its rates and service according to Argentine law, and may not reduce its rates lower than those in force on the Government owned and operated cable between Buenos Aires and Montevideo. It must also transmit all official telegrams of the Argentine Government, whether originating in Argentine or some foreign country, at 50 per cent of the ordinary rates. It may engage in international traffic only and must limit its cables to telegraph use, telephone service not being permitted.

In case of war or any other great danger to the Argentine nation, the Government may take over the company's cables, indemnifying them at rate of return shown by the company for the one-month period previous to such taking over. The Government likewise may take over the cables, if for any reason the existing Government cables between Argentine and Uruguay or Brazil break down.

Fifty per cent of the employees of the company must be Argentine citizens or, if that is impossible, the manager or assistant manager of the company must be Argentine citizens.

The company must have a legal representative in Buenos Aires who will serve as a means of communication, as all changes in service and equipment must be approved by the Argentine Government before being put into effect.

The company is given ten months to present its completed plans; in case it fails to do this or fails to maintain good-faith deposit required, the Argentine President has the right to cancel the concession without indemnification.

New Telephone System Project in Gibraltar

THE present privately owned telephone system at Gibraltar is inadequate and unsatisfactory and a long projected improvement has been initiated. The City Council of Gibraltar has issued an ordinance which gives the necessary authority, and this has been forwarded to the Government at London for approval.

After the necessary legislation has been enacted the Crown agents for the colonies will send out an expert telephone engineer to make a thorough investigation of the situation and prepare the specifications. The Crown agents for the colonies will send these out and receive the bids, which will be forwarded to the City Council at Gibraltar for consideration and final decision.

There seems to be no discrimination at Gibraltar against American participation in this business.

It is expected that a great increase in the number of telephone users will result from the improved system with its cheaper rates. This growth is also enhanced by the fact that the system will eventually be connected with the Spanish telephone system by trunk lines at the Spanish frontier town of La Linea.

Radio at Sea

THE Dansk-Radio Corporation, in its annual report for 1923, states that the use of wireless equipment in the Danish merchant marine is constantly increasing. At the close of 1923 there were 201 ships equipped with wireless, as compared with 184 at the close of the previous year. A station is to be erected at Gilleleje, a small town on the north of the island of Zealand, so that vessels in the Kattegat will be able to ask for and receive directions as to their position. If this station proves successful, it is planned to erect similar stations at a number of places among the Danish coasts.—*Commerce Reports.*

Radio Service Between Syria and Yugoslavia

TELEGRAPHIC communication by radio, established between Beirut, Syria, and Belgrade, Yugoslavia, has recently been made available for commercial uses through an ordinance issued by the French High Commissioner for Syria. Messages are sent by radio at the same rates charged for their transmission by cable and land lines. The present rate per word is 24.70 Syrian piasters ($0.25) for regular telegrams and 12.35 Syrian piasters ($0.12½) per word for deferred messages.

Milwaukee's Telephones

MILWAUKEE recently celebrated the forty-fifth anniversary of the installation of its first telephone exchange. The number of telephones has grown from fifteen in 1879 to more than 105,000 to-day According to the latest available figures, Milwaukee, with about one-thirteenth the population, has more telephones than the entire country of Belgium.

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EDITORIAL COMMENT

Commercial Wireless Business

ANNOUNCEMENT of extensive improvements to handle commercial wireless business with China, which includes construction of new high-powered units at Bolinas and the opening of a new headquarters at 28 Geary Street, was made recently by the Radio Corporation of America through its Pacific division manager, Arthur A. Isbell.

The preliminary tests between Peking, Shanghai and the Radio Corporation units at Bolinas and Marshall, which constitutes the main trans-Pacific station of the company, convinced engineers that continuous communication can be maintained at all hours directly between the Old and New worlds without relay. As a result the company is enlarging to meet the coming business.

The entire administrative, divisional and executive offices at 344 California Street will be moved to the new Geary Street address, as will the operating division at 300 California Street, and the Radio Institute of America, in which ship and station operators are instructed, will be incorporated.

The corporation will occupy the entire top floor at the new site, and will be linked with the Western Union Telegraph Company by a pneumatic tube service, which will wed land lines and radio channels with a minimum of time loss.

At Bolinas, extensions and additions are under way which will make the location one of the biggest high-powered radio centers in the world. For the China communication work, eight giant towers, 600 feet in height, of the self-supporting type used at Rocky Point on the Atlantic Coast, will be erected to support a gargantuan antenna 8600 feet in length. A new power house and power unit will also be constructed to supply current for the equipment.

The entire transmitting equipment at Bolinas and the receiving units at Marshall will be connected to 28 Geary Street by land wires, so that operators in San Francisco may control the whole vast fabric of Pacific communication, directly from the main office. The change from one location to the other, will be accomplished, according to Manager Isbell, without a moment's interruption in the daily service between the Pacific Coast and Hawaiian and Japanese points.

The new installations are also being made with a view of possible communication with Australia at a future date, when necessary arrangements have been made.

Automatic Telephony

THE third automatic telephone exchange in Belgium is about to be opened at Schaerbeek, Brussels. The system installed is that of the Western Electric Co., Ltd.

Busiest Year for Western Electric

BUSINESS larger than in any period during th fifty-five years' experience of the Western Electri Company has been reached during the first fiv months of 1924.

"The large increase represents, of course, the con sistent efforts we have been making to keep th manufacture of telephones and telephone apparatu in pace with the continued growth of the Bell Sys tem and the demand for telephone service," says statement by Charles G. DuBois, president of th Western Electric Company.

"We are making this year what seems to us colossal effort. We have planned to produce durin every minute of the working year lead covered tele phone cable containing wire forty miles in length We hope to keep up the pace of eight telephone desk sets every minute of the normal working year; an one section of multiple switchboard and six section of small boards every hour.

"These efforts at increased production in orde to assure continuous telephone development by suit able measures in the telephone factories, have re sulted in the large total figures for our 1924 busi ness so far.

"It is natural to believe that the demand which causes our exertions is a sign of fundamental sound ness in general business in America. It gives us an optimistic sense of a continuous sound develop ment, regardless of local and temporary fluctua tions."

Some Interesting Facts Concerning the Telephone

THE State of Nebraska has 50,000 more tele phones than the whole of South America. Los Angeles has 25 times as many as Naples, the largest city in Italy.

A telephone message travels across the continent in one-fiftieth of a second. Requirements for tele phone equipment increased three-fold from 1919 to 1924.

There are more telephone operators in the United States than there are telephones in Russia and Fin land combined. Denver has one telephone for every five people. Rome, Italy, has only one telephone for every 45 inhabitants.

There are 700,000 telephones in Chicago. It took twenty years to reach the first 100,000 mark but only two years for the last 100,000. An average of over 2,800 telephones were added every working day of 1923 to the telephone systems in the United States.—*Telephony.*

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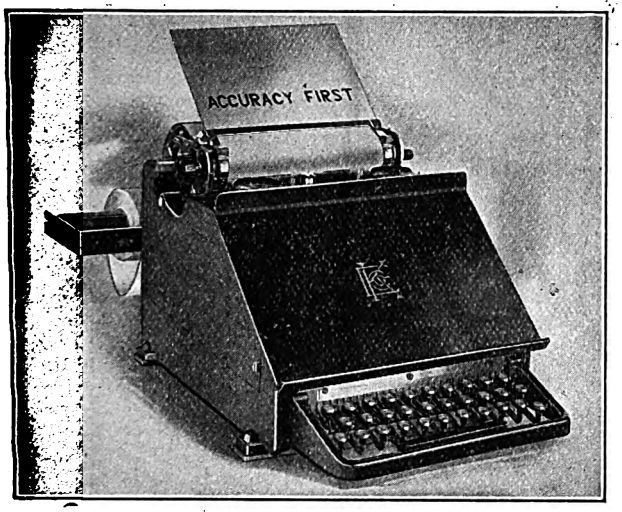
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER

AN ENTIRE SYSTEM IN



ONE SIMPLE TYPEWRITER UNIT
Not Merely A New Design.
A Revolutionary Change.
The Unit that proves in on lightly loaded circuits.

Kleinschmidt Electric Co.
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HALL SWITCH & SIGNAL CO.
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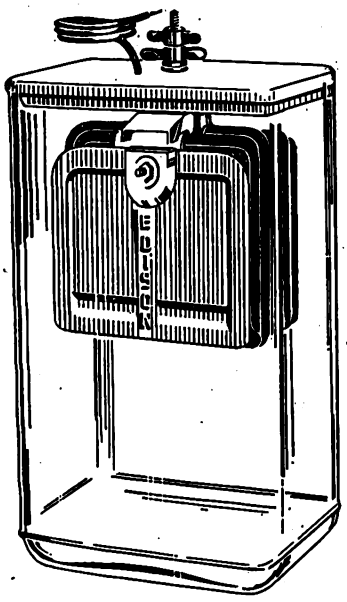
MANUFACTURERS OF THE

GILL SELECTOR

THE UNIVERSAL SELECTOR
FOR
TELEGRAPH AND TELEPHONE

Standby Life



Edison Primary Batteries have an indefinite standby life. On the shelf or in any open circuit, Edison Cells are always resting because of the small amount of internal chemical reactions.

Yet, when called upon for real action, Edison Primary Batteries are always on the job, doing the work they do the best—supplying a dependable source of energy for Telephone Service.

Edison Cells last about twelve times as long as dry cells, supply a uniform voltage throughout their entire rated life and will give more dependable service at a lower cost than any other form of battery energy.

Thomas A Edison, Inc.
EDISON SIGNAL BATTERIES-PRIMARY and STORAGE
BLOOMFIELD - NEW JERSEY

ST. LOUIS Railway Exchange Bldg. CHICAGO Peoples Gas Bldg. SAN FRANCISCO Balboa Bldg.

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Effects of Aurora Borealis on Communication Circuits and Means of Mitigation

By John B. Taylor
Consulting Engineer, General Electric Company

An ideal communication circuit is one ready at all times for working—at the highest speed in case of the telegraph—or in the case of the telephone, at the highest intelligibility.

An elaborate organization is needed to design, construct, maintain and operate, and many factors conspire to partially or wholly prevent the circuit from working at its best.

Leaving out of consideration such problems as hours of service, proficiency of operators, spirit of team-work or morale, and general organization, there remain a number of "hazards" which prevent any but the shortest circuits in rare cases having a perfect record for continuity and reliability. The Aurora Borealis is but one of many such hazards.

Natural causes produce the aurora; the disturbance comes into the communication system by way of the connecting lines; though the lines are outside plant, the effects are ordinarily evident only on the receiving portion of the inside plant.

The causes being natural (or beyond the control of man) auroral disturbances cannot be avoided by suppressing or moving the aurora. Since the line conductors themselves are not damaged by aurora, and experience shows that underground and submarine conductors bring in auroral disturbances equally with overhead lines, we cannot look to changes in line construction as a solution or remedy.

Before going into further detail on effects and remedies, let us turn our attention to the aurora itself. Aurora Borealis is but one of several names applied to a meteorological phenomenon. Equivalent terms are "Northern Lights" or "North Lights." However, since the appearance is not peculiar to the north portion of the globe, Aurora Polaris, or polar lights, are better general terms. The term "Aurora Australis" is a more specific designation for polar lights when seen in the anarctic regions.

The polar lights are seen as a luminous glow in the sky in a variety of forms and color tints at different distances and directions. Because the luminous intensity is low, the aurora is never visible unless the sun is below the horizon. The forms are described and pictured as arches, curtains, streamers, etc. The color is principally whitish with tendency towards yellow; red, green and less frequently blue are also reported. The prevailing direction depends on the location of the observer with respect to the magnetic poles and to magnetic field lines of the earth.

Many observations indicate that the streamers follow the magnetic lines of the earth's field. This means, not only the azimuth of the field as shown by the mariner's compass, but also the direction of the field in altitude as indicated by the less familiar dipping needle. Because of impressions due to perspective and our inability to receive accurate impressions of distance for objects in the sky, a single observation may give erroneous impressions of the distance, height or true direction of the auroral streamers. For example, a series of parallel streamers following the lines of the magnetic field appear in a sort of crown, with the center in the direction given by compass and with angular elevation of the coronal apex corresponding closely with the angle of the dipping needle in that particular portion of the globe.

The height of the auroral displays above the ground is determined most accurately from two or more photographs taken simultaneously with cameras placed on base lines several miles in length. By carefully noting the angles at which the cameras are set, the plates afford data for calculating the height of lower edge or some prominent detail of the aurora which can be satisfactorily identified as appearing on both plates. Stars which may also appear on the developed places give precise reference points for determining the angles. Many such photographs have been made by Stormer, Vegard and others. The latest, and presumably the most accurate, is the series of observations indicating auroral heights ranging from 87 Km. (52 miles) to 500 Km. (300 miles) with a marked preponderance of photographic heights for the lower end of streamers at either 100 Km. or 106 Km. (60 miles or 64 miles). The base line used for the two cameras was 27 Km. (16 miles).

In fair agreement with these heights are observations made before the days of photography and before anyone knew how to put up a telegraph or telephone line connecting separated observing points to aid in making the two observations simultaneously.

In addition to figures given there are reported many observations indicating auroral displays at less, as well as at greater, elevations. Lemström and others appear to have been satisfied that streamers came within a few hundred meters of the earth, or less than one mile, and estimates on upper limits extend to 500 or 1,000 miles. Some observations gave negative angles which, for obvious reasons, had to be attributed to inaccuracies or errors and discarded.

The brightness of the aurora is not sufficient to permit taking instantaneous photographs. In the early work, exposures of several minutes were required to obtain satisfactory negatives—but, in the more recent work, the use of lenses with large apertures and plates specially sensitized permit working on the highest auroras with exposures in the order of one second. The auroral displays are, as a rule, shifting in position and also changing in brightness and color in the different streamers or elements building up the curtains, arches and other forms.

The spectroscope gives a number of lines, many of which are regarded as corresponding to lines known to come from some of the gases composing the atmosphere. In this line of work, the wave lengths reported by different observers are not in close agreement. Perhaps we represent a fair con-

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sensus of opinion by saying that many of the lines which the spectroscope brings out from nitrogen in a Geissler tube are seen in the aurora spectrum —but that the most prominent characteristic auroral line of greenish yellow color with wave length .5578 W results from some unknown substance of unknown condition, since it does not correspond well with any line found elsewhere.

The spectrum taken in connection with the estimated rarity of the atmosphere lead naturally to the assumption that the luminous glow of the aurora results from an electrical discharge through the attenuated atmosphere.

Let us now mention briefly a few points leading to some connection between the aurora and our telephone and telegraph systems. Without taking the time to name with dates the early attempts to develop an electrical telegraph, the age of this form of communication is approximately 100 years. The practical surviving form, i.e., the electromagnetic telegraph, required a number of years for reduction to practice after Oersted in 1820 definitely demonstrated the deflection of a magnetic needle by a current of electricity in a nearby wire. Earlier writers had suspected a connection between electricity and magnetism but the point was one of mere speculation based on certain similar features of attraction and repulsion.

The aurora has a much older history and was doubtless observed and remarked on as a natural wonder as early as there were men to wonder at anything. Explanations of the aurora would naturally be determined by the prevailing thought of the time; in the more distant past as something supernatural though regarded with less awe than the lightning and thunder because unaccompanied by fire, destruction of property, and loss of life.

There is an old Norwegian writing of seven or eight centuries back suggesting that the aurora was light given out in the winter by the arctic ice from what had been stored up during the hours or days of sunshine—in other words, a glorious display of phosphorescent light.

Though the magnetic compass may have been known and used in China for a long time, it appears to have been known in Europe only since the 13th century. Early compass forms were crude, travel was relatively limited, and the art of navigation simple compared with later-day methods. Consequently, years passed before it became generally known:

That the compass did not point to the geographic or astronomic north pole;

That the deviation from true north varied in different parts of the world;

That the amount of this deviation changed slowly through a cycle of many years;

That small but fairly regular compass deviations are a matter of daily occurrence;

Also, that occasional, irregular and unexpected movements of the needle of several degrees might occur.

It was also noted that these unexpected and sudden compass changes known as magnetic storms frequently occurred at the same times or on the same days that displays of aurora were noted by the same observers or reported by others.

All of these facts relating to the magnetic state of the earth as disclosed by magnets in the form of compass and dipping needle, and especially the coincidence of magnetic displays and auroral storms, were noted and discussed many years before electrical discoveries had paved the way for our telegraph.

Besides lightning and northern lights, meteors or shooting stars were natural wonders lighting up the sky, and some meteors which struck the earth had been found to consist largely of iron, the only known magnetic substance.

With these facts in mind, it is possible to understand how one so competent in drawing conclusions and so cautious in stating opinions as Dr. Thomas Young should suggest that the aurora resulted from some finely divided form of iron in the upper atmosphere. He says ("Lectures on Natural Philosophy," 1807):

"Magnetism," page 687:

"* * * The aurora borealis is certainly in some measure a magnetical phenomenon, and if iron were the only substance capable of exhibiting magnetic effects, it would follow that some ferruginous particles must exist in the upper regions of the atmosphere. The light usually attending this magnetical meteor may possibly be derived from electricity, which may be the immediate cause of a change of the distribution of the magnetic fluid, contained in the ferruginous vapours, that are imagined to float in the air."

Page 690:

"* * * Temporary changes of the terrestrial magnetism have certainly been sometimes occasioned by other causes; such causes are, therefore, most likely to be concerned in the more permanent effects. Thus, the eruption of Mount Hecla was found to derange the position of the needle considerably; the aurora borealis has been observed to cause its north pole to move 6 or 7 degrees to the westward of its usual position; and a still more remarkable change occurs continually in the diurnal variation. In these climates the north pole of the needle moves slowly westwards from about 8:00 in the morning till 2:00, and in the evening returns again; a change which has with great probability been attributed to the temporary elevation of the temperature of the earth, eastwards of the place of observation, where the sun's action takes place at an earlier hour in the morning, and to the diminution of the magnetic attraction in consequence of the heat thus communicated. In winter this variation amounts to about 7 minutes, in summer to 13 or 14."

Page 694:

"There is no reason to imagine any immediate connection between magnetism and electricity, except that electricity affects the conducting powers of iron or steel for magnetism, in the

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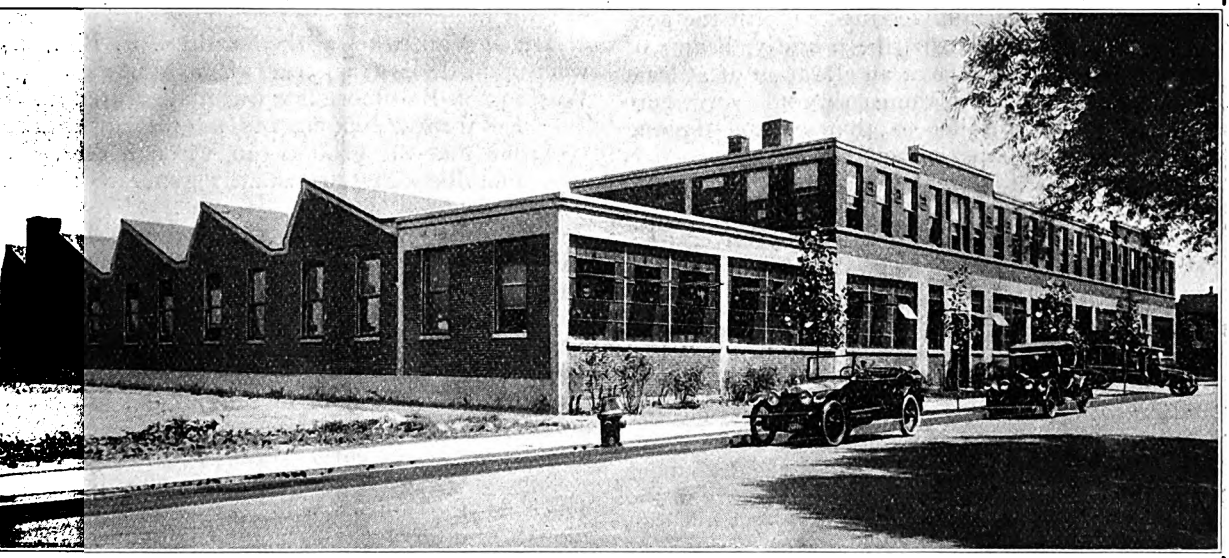
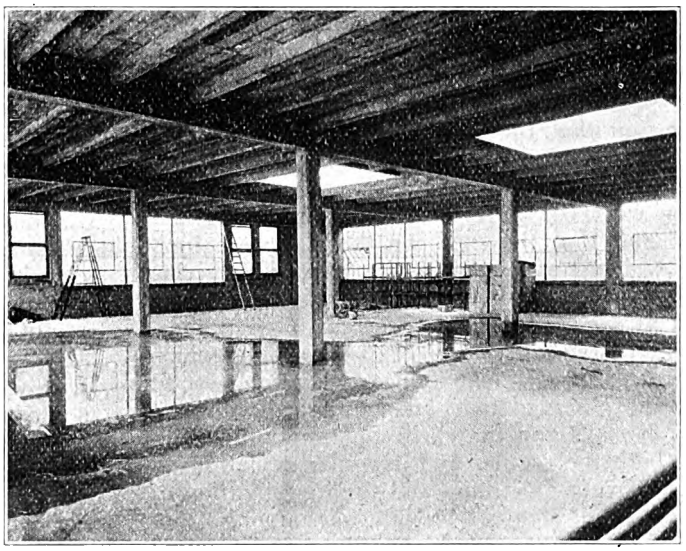
MORKRUM PRODUCTS



THE FACTORY BEHIND THE PRODUCT

DEMAND FOR
MORKRUM PRODUCTS
MAKES IT NECESSARY
TO BUILD
NEW ADDITION
TO FACTORY



NEW ADDITION NEARING COMPLETION

MORKRUM COMPANY

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same manner as heat or agitation. In some cases a blow, an increase of temperature, or a shock of electricity, may expedite a little the acquisition of polarity; but more commonly anyone of these causes impairs the magnetic power. * * *"

"On Aqueous and Igneous Meteors," page 716:

"It is doubtful whether the light of the aurora borealis may not be of an electrical nature: the phenomenon is certainly connected with the general cause of magnetism; the primitive beams of light are supposed to be at an elevation of at least 50 or 100 miles above the earth, and everywhere in a direction parallel to that of the dipping needle; but perhaps, although the substance is magnetical, the illumination which renders it visible may still be derived from the passage of electricity, at too great a distance to be discovered by any other test."

Eleven years after Oersted's discovery, Faraday had determined broadly the laws of electromagnetic induction, but this tended for a time to increase rather than decrease the number of theories accounting for the aurora. For example, did electric currents in the aurora alter the strength and direction of the earth's magnetic field, or did changes in the earth's magnetic field, induce currents in the rare atmosphere making their presence evident in the aurora? Which was cause and which was effect?

A tabulation of a number of auroral displays visible during a long term of years was found to bear some correspondence with similar tabulations of the frequency and extent of sun spots. To suggest that conditions on the earth giving rise to auroral displays would be a cause of increased number or size of sun spots appeared as unreasonable as would be a suggestion that the wagging of a tail controlled the disposition of a dog. It was, therefore, quite natural to express the opinion that the sun was the primary cause of auroral displays and magnetic storms, and that the spots on the sun were incidental evidence of unusual solar conditions giving rise to a special radiation or emanation extending at least as far as the orbit of the earth. The most recent studies and discussions revolve around which of several forms of emanation or radiation best fit in with the observed facts and numerical values of auroral displays and the earth's magnetic field, including both the regular and irregular deviations.

The discovery of radium and the investigation of this remarkable element brought out, among other things, the existence of Alpha, Beta and Gamma rays, and it has been natural to suggest and consider one or the other of these three forms of rays as coming from the sun and causing the auroral and magnetic actions. The approximately straight lines seen in the auroral streamers and the greater ability of the Alpha particles to penetrate the upper atmosphere without sensible turning from collisions with gas molecules are some of the reasons for Vegard's * favoring the theory that auroral displays are the visible evidence in the light following collision of positively charged Alpha particles thrown out from the sun colliding with molecules of gas at low pressure.

Scarcely had the early telegraph lines gone into service with "ground return" when reports were made indicating the presence of currents in lines and apparatus from sources other than the Voltaic cells or batteries.

Alfred Vail, who worked with S. F. B. Morse, writing in 1845 (the year after Morse's original Washington-Baltimore line was inaugurated), says:

"From these experiments, the fact appears conclusive that the ground can, through the agency of metallic plates, constantly generate the galvanic fluid."

Without more complete data on the length of line, its resistance and current generated by the earth plates or received through them, we cannot be sure if Vail had observed earth currents such as accompany an aurora. It is reasonable to suggest this possibility, as a single cell of copper and zinc plates in the weak acids or salts of the soil will be unlikely to supply enough current over even a short line to operate the early forms of instruments.

Apparently the first to definitely note the coincidence of the aurora with earth currents strong enough to interrupt telegraphic communication was Matteuci at the time of the auroral display of October 28, 1848. The correctness of his observation was clearly established a few years later in connection with the great aurora which was observed over the whole of the American Continent on the nights of September 1 and 2, 1859. This aurora was not visible in Europe because of daylight, but

"At all the telegraph stations in France the service was impeded during the whole of September 2 (1859), but especially at two periods of the day, from 4:30 A. M. to 9:00 a. m., and from noon to 3:00 P. M. * * * a current producing continuous attraction of the armatures of the electro-magnets; a galvanometer introduced into the circuit showed that the current changed its direction at varying intervals of time of at least two minutes duration. Towards 7:00 A. M. and 2:00 P. M. these currents were so strong that when the wire was isolated, and a conducting substance presented to it, it gave off vivid sparks. The currents manifested themselves in all directions; they seem, however, to have been more marked on the lines which went from north to south. The longest wires always showed the greatest disturbances." (Angot.)

(*To be Continued*)

* "Bericht über die neuren Untersuchungen am Nordlicht," by L. Vegard in Vol. 14, No. 4, "Jahrbuch der Radioktivität und Elektronik," 1917.

Prime's Life of S. F. B. Morse

THIS work was authorized by the family and executors of the great inventor, compiled from original data. It includes the history of the invention of the telegraph and the many important business connections with those who were interested with Prof. Morse in the development of the telegraph; sheepskin; 775 pages; illustrated; $3.00.

Remit to and address Telegraph and Telephone Age, 253 Broadway, New York.

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PERSONAL

John T. Needham, president of the Pneumatic Tube Supply Company, Plainfield, New Jersey, is in California, in connection with extensive tube installations which his company has contracted to put in the West.

POSTAL TELEGRAPH-CABLE CO.

C. H. Mackay Host to Prince of Wales

THE Prince of Wales was the guest of Clarence H .Mackay recently at a dinner and dance at Harbor Hill, Mr. Mackay's country home at Roslyn, L. I. The fact that Mr. Mackay was host to the Prince recalled the fact that Mr. Mackay's mother, Mrs. John W. Mackay, had frequently entertained at her home in London King Edward VII., grandfather of the present Prince of Wales. Many years ago one of the most brilliant entertainments that Mrs. Mackay gave in her mansion at 6 Carlton House Terrace, London, was for the late Princess Mary Adelaide and her husband the Duke of Teck, and their daughter, Princess Mary, now Queen of England and mother of the Prince of Wales.

HARBOR HILL A BLAZE OF LIGHT

Harbor Hill, the Mackay estate, is on the highest point of Long Island, where, during the Revolutionary War, watch fires were built to warn of the approach of the British troops. Mr. Mackay's house, built at the top of the hill, is a reproduction of a French eighteenth century chateau, suggesting the famous Maison Lafitte and its formal gardens and terraces, which resemble those of Versailles. The house is approached from the main road by a long and winding drive which was brilliant with thousands of electric lamps strung on a double row of maple trees lining it or hidden in the foliage. The predominance of blue lights gave a moonlight effect and illumination was visible for many miles about.

The Prince arrived at Harbor Hill at 8:30 P. M. Mr. Mackay met him at the entrance and escorted him to the great hall, which houses one of the most famous collections of medieval armor in the world and is hung with battle and processional flags of the sixteenth and seventeenth centuries. In this hall the Prince was greeted by Mrs. John W. Mackay, mother of the host, and by the two daughters of Mr. Mackay, Miss Ellin Mackay and Mrs. Kenneth O'Brien, and Mr. O'Brien.

There were flowers in abundance in the banquet hall, although the room does not call for further embellishment than its famous Gothic tapestries. The Prince escorted Miss Ellin Mackay to dinner, Mr. Mackay following with Lady Isabella Howard, wife of Sir Esme Howard, the British Ambassador at Washington. Paul Whiteman's orchestra played during the dinner.

The dinner guests included the immediate entourage of the Prince, prominent American Officials, members of the American and British polo teams and their wives and some close friends of the Mackay family. The dinner service used was made many years ago by Tiffany & Co. from silver from the Nevada mines of John W. Mackay. Its design suggests in some details the scenes of life in the pioneer days of the "Golden West."

After the dinner guests began to arrive from New York and all parts of Long Island for the reception and dance. They were received by Mr. Mackay and the Prince at the entrance of the great hall, where the double Whiteman Orchestra alternated for dancing. Supper was served at small tables placed in the dining room and in a large marquee that had been built on the lawn. It is estimated that 1,200 persons came for the reception. While something more than 800 invitations had been sent out, many who were entertaining friends in anticipation of the polo matches were privileged to bring the members of their house parties.

C. A. COMSTOCK, vice president, is back at his desk after several weeks spent motoring through New England.

Overton Harris, assistant counsel, has returned from several weeks trip to Europe.

W. B. Dunn, secretary, also returned from his vacation.

Dr. Margaret T. Underhill, wife of E. M. Underhill, of the complaint department, left recently for a visit to Scotland.

W. S. Hallett, superintendent of supplies, is spending his vacation via the trans-Atlantic route.

The Postal Telegraph magazine for the month of September contains a very interesting writeup of Jacksonville, Fla., together with a description of the Company's new office at that place. Expansion of business made necessary the vacating of the old quarters at 115 West Forsyth Street to the modern five-story building on the southwest corner of Forsyth and Hogan Streets, directly across from the Seminole Hotel and diagonally opposite the Post Office, and in the very center of the financial, retail and industrial section. The business office, located on the ground floor, is very roomy and well lighted and was designed to be pleasing to the eye as well as comfortable to the public. The furniture and counters are of African mahogany. The operating department is located in the Heggie Building adjoining and is fitted up with the latest and most efficient type of telegraph equipment. The office is in charge of Manager J. T. Logue, while J. O. Heath is in charge of the operating department as chief operator.

Incorporated in the Jacksonville article is a description of nearby St. Augustine, with its quaint old streets and ancient fort.

The article is illustrated with many scenes depicting the commercial development as well as the attractive features of Jacksonville. Also, pictures typical of St. Augustine.

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THE WESTERN UNION TELEGRAPH CO.

Lee Lemon, of the commercial department, New York, is spending his vacation at Beach Haven, with his family.

Charles E. Davies commercial department, New York, spent a few days in Toronto, Canada, in August.

P. O. PURCELL who left New York on March 1st on the Steamship Olympic for a six month's furlough has returned on the Steamship Leviathan. During his sojourn in Europe, Mr. Purcell visited Italy, France, Germany, Holland and the British Islands, and reports a joyous and a very educational trip.

Death of Dennis F. Brown

DENNIS F. BROWN, one of the best and widest known members of the telegraph business died in Washington, D. C., on Monday, September 8th, after an illness more or less brief, but sufficiently acute to incapacitate him from pursuing his usual activities. Mr. Brown was wire chief for the Western Union Telegraph Company at Washington for several years and his length of service with that Company made him eligible for a pension.

A native of Boston, Mass. he came to New York and spent his early days with the various telegraph companies then operating in New York, previous to entering the service of the Western Union Telegraph Company, finally going to the latter's Washington office. Possessing a genial and good natured disposition he made friends quickly and retained their good feeling and respect. Besides being noted for a readiness to aid those in distress, he had a marvelous faculty of interjecting singularly appropos witticisms in conversation, which made him most companionable. His death is sincerely mourned by a host of friends who knew him intimately and esteemed his friendship.

Suspicious circumstances surround the mysterious theft sometime during the early morning of September 2nd of $1,500 from the safe of the Company at Paterson, N. J. Sergeants Lord and Morrison are co-operating with Western Union investigators in an attempt to ascertain the identity of the thief.

W. F. Siegle, local manager, reported the robbery at 8 o'clock to Detective Captain Joseph Mosley. He stated that two clerks were in charge at 12 o'clock midnight when the office was closed and that the one in charge was seen by the other to place the money into one of the small drawers of the safe. The $1,500 was used as a reserve fund to cash all telegraph drafts that were sent through the local office and did not represent the day's receipts.

The strange thing about the robbery, which leads Detective Sergeant Lord to believe it was an inside job, is the fact that both the outer door and the safe were locked when Manager Siegle opened the office in the morning. There was no marks on the door or safe that would indicate the entrance to the office was forced.

The thief evidently knew of the $1,500 in the safe and was interested in taking only that amount, for in another drawer was found $30 and some small change untouched. Nothing else in the office was disturbed. Detectives are proceeding cautiously in their investigation of the robbery and although they have questioned all of the employees, they would not state what conclusion they had reached.

—o—

Between midnight and 7 o'clock on August 27th, electricians "cut in" the last loops of the circuit at Eldorado, Ark., and the most modern telegraph depot in the four states of the Gulf Division was opened for business at Jefferson Avenue and Oak Street. The temporary quarters on South Jefferson, used since the fire which destroyed the old Schuler building were promptly evacuated.

Motor-generator equipment and office space in the new building permit a working force of 25 or 30 operators, although only eight are employed at present. In every respect the plant is double the size normally required by a city of El Dorado's class, and is a notable example of the Western Union policy of building for the times that are coming.

Efficiency has been carried to the last extreme. Wires from 60 offices relayed through El Dorado may be concentrated before one operator. Operators and delivery boys are connected in turn by a system of overhead carriers extending from the instruments to the traffic department. The public and local office are brought into a closer touch by three trunk telephone lines and a P. B. X. board, which almost eliminates the word "Busy."

Five motor-generators and an exceptional switchboard give the El Dorado office a supremely equipped plant. Back of the mechanical devices are rest rooms for men and women, and for the delivery boys as well. The office and adjoining rooms are attractively furnished, and the customer and delivery counters are notable for being finished in oak.

Plans and specifications were drawn by S. J. Buckalew of Dallas, and the equipment installed by electricians Keck and McGuire under direction of J. A. Hunter.

Fletcher Ragland, manager, has the following staff: W. Hanson, chief operator in charge of traffic; J. H. Lackey, night manager; J. Q. Ferguson, night chief operator, and J. T. Young, manager of the delivery department.

Boy "Millionaire" Has Short Career

Frank Foreleski, aged sixteen years, employed by the company at New York, who had been a "millionaire" for a week with $275, was arrested last night in all the glory of his new gray suit, silk shirt, yellow shoes and drooping straw hat. He was locked up in the West Thirtieth Street police station, charged with the theft of the $275.

Frank didn't mind. It had been a glorious week, he said. The only flaw was that he failed to see the Prince of Wales, although he had taken a room

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a hotel in Syosset solely for that purpose.

The money he is accused of stealing was intrusted him August 26th, two days after he had become messenger. He was brought up in an orphan sylum in New York City, he said, and had never een more than $5 assembled in one spot.

He was on his way back to the orphan asylum to stonish his former pals when arrested.

THIS company will establish its own building at ainesville, Fla., where it will maintain a new main ffice.

The switchboard is in and light fixtures have been nstalled. Much of the new material for the more pacious offices has already been received and it is xpected that the new location will be occupied by eptember 15th.

As soon as the offices are moved the new call sys-em will be installed, and much of the worry and ggrevation of waiting on telephone connections hen a messenger is wanted will be eliminated.

MRS. JOHN G. MATOON, aged eighty-one years of Baltimore, Md. visited the office at Cincinnatti Ohio, ecently and was surprised at the many changes in he way messages are handled now. Her husband vas a co-worker with Thomas A. Edison, L C. Weir, Andrew Carnegie and Eugene Baker and was one of the principal organizers of the Old Time Teleg-raphers and Historical Association which was organ-zed in Cincinnatti. He worked the Cincinnatti end of the Baltimore wire up to 1873 when he went to Baltimore. He was an intimate friend of Thomas A. Edison who also worked in this office at that time. She is still very spry. Mrs. Mattoon is visiting a nephew at Fort Thomas for a few days and recalls many of the old time telegraphers.

Radio Corporation of America

E. J. NALLY, Managing Director of Foreign Re-lations, returned to New York on the steamship "France" for a short stay. He was accompanied by his wife and son E. J. Nally, Jr., of Princeton University, who spent the summer abroad with his parents.

M. Berger, office manager, sales department Radio Corporation of America, has returned from an automobile trip through Canada and upper New York State, which he made with his family during vacation.

All Amercia Cables

F. L. HENDERSON, supervisor at Punta Arena, Costa Rica, returned from furlough.

W .A. Costa, operator at Sao Paulo, Brazil re-turned from furlough.

E. C. Gornell, chief clerk returned from furlough to Balboa, C. Z.

L. B. Proudfoot returned to Punta Arena, Costa Rica, from furlough.

J. S. Whaley, manager at Santa Elena, Ecuador, returned from furlough.

J. O. Wiseman, acting manager at Santa Elena, Ecuador left on furlough.

A. Cooper resumed his duties as manager at Colon.

O. H. LUKEN, traveling auditor, who is on his va-cation, sailed from New York for Europe on the steamer Majestic on September 6th. He will re-turn in about two months.

OBITUARY

WILLIAM MOULDER UHLER, aged fifty-two years, a resident of Washington, D. C., for twenty-five years, died at his residence, 1858 Columbia Road, on August 20th, of heart disease, following a brief illness.

Mr. Uhler at one time conducted a hardware store at Seventh and K Streets southwest. At the time of his death he had a position with the Western Union Telegraph Company. He is survived by his wife, two sons and two daughters.

Funeral services were conducted at 202 North Washington Street, Alexandria, Va., on August 23rd. Interment was in the Presbyterian Cemetery in that city.

Charles V. Clinton, aged seventy-five years, said by his family to be the first male white child born in Utah and one of the oldest railroad men in the state, died on August 18th.

Mr. Clinton was born in this city October 16, 1848, and was a son of Dr. Jester Clinton and Melissa Snow Clinton.

He began his railroad career in 1883 with one of the pioneer companies of the state, and was retired from active service by the Los Angeles & Salt Lake Railroad Company in July, 1922. He was agent for that line at Juab at the time of his retirement, a position he had held many years.

His father was one of Utah's pioneers and built and operated the old stone hotel beyond Garfeld near Lake Point.

He is survived by his wife, two daughters and a son.

Funeral services were held at Twenty-seventh ward chapel, Fourth Avenue and P Street, on August 10th. Interment was in City Cemetery under the direction of S. M. Taylor Company.

MRS. ELIZBETH C. MCCUNE, wife of A. W. McCune, a lifelong worker in the L. D. S. Church and, with her husband, well known Utah mining man, engaged in numerous charitable and philanthropic works, died on August 1st of pneumonia in her suite at the Hotel Utah, following an illness that began two months ago while she was in the Bermudas.

Funeral services were held on August 3rd, in the Assembly hall, under the direction of the Geneal-ogical society of the L. D. S. church. Charles W. Penrose, president of the society, and President Heber J. Grant were the principal speakers. Elder Joseph Fielding Smith conducted the services. Special seats and places were reserved for L. D. S. temple workers, genealogical workers and members of the Laminite society, in which Mrs. McCune was

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an active worker.

Music was furnished by the tabernacle choir, with Professor Anthony C. Lund in charge. At the close of the services a special train conveyed the body and the funeral party to Nephi. Services at the grave in the family burial ground in Nephi were conducted by the president of Juab stake.

Funeral services for George C. Fenton, formerly of Salt Lake, who died at San Francisco, Cal., on July 15th, were held at the residence of his brother, Samuel F. Fenton, 65 North Second West Street. The Rev. Dr. William M. Paden had charge, assisted by the Rev. Frank Kraft of Laramie, Wyo., a nephew of Mr. Fenton. Dr. William R. Worley sang a solo. Interment was in City Cemetery.

Mr. Fenton was associated with his brother in founding the Intermountain Electric Company in Salt Lake years ago. He also was a member of the Old-time Telegraphers and Historical Association, many members of which attended the services.

New British Guiana-Barbados Cable

A SUBMARINE cable connecting Barbados with Georgetown, British Guiana, was landed at Georgetown during the early part of June. This cable is a branch of the West India and British Guiana system undertaken by the British Imperial Government, and is to be operated under the management of the Pacific Cable Board. An annual subsidy of $3,600 in British Guiana currency (roughly $3,400 in U. S. currency) will be paid by the British Guiana colonial government for its share of the maintenance of the cable system.

Since 1919, the submarine cable connecting Georgetown with Port of Spain, Trinidad, British West Indies, has been interrupted, and all cable communication from Georgetown has been handled by the West India and Panama Telegraph Company over the British Guiana government wireless.

Radio Phone Receiving

Radio Phone Receiving is the title of a book that was placed on the market on May 1. It is a practical work for everybody and was written by nine specialists. It contains 224 pages, fully illustrated. The book measures 7½ inches long by 5 inches wide. The price is $1.50 per copy.

The authors include Michael I. Pupin, Alfred N. Goldsmith, Erich Hausmann, Frank E. Canavaciol, John H. Morecroft, Robert D. Gibson, Louis A. Hazeltine and John V. L. Hogan.

The very questions frequently asked by the radio operator are answered in this book. Explanations and solutions of the difficulties encountered by the radio enthusiast are treated in a clear and comprehensive manner. The book fills a long-felt want. It is just what you have wished for! It will teach you how to receive messages of any wave-length to perfection. It will help you to solve your troubles and save you money in the proper selection of the apparatus required. The last word in telephone receiving, beautiful photos and simple diagrams accompany the text. Regardless of what other books on radio you own—this is the book you must have. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

New Edition of Beginner's Manual of Submarine Cable Testing and Working, by G. M. Baines

Beginner's Manual of Submarine Cable Testing and Working, by G. M. Baines, has been thoroughly revised by its author and it was issued in fourth edition form on June 1, 1921. The book is primarily for students in submarine telegraphy. All of the subjects on submarine telegraphy demanding attention have been brought within the scope of this volume, and have been dealt with, if not exhaustively at least at sufficient length to enable an intelligible idea to be obtained of them, which will admit of wider extension later. The book measures 5½ inches wide by 8½ inches long and contains 174 pages fully illustrated. The price of the work is $4.50 per copy, and it may be obtained at the office of TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.—Advertisement.

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CONTENTS.

Effects of Aurora Borealis on Communication Circuits and Means of Mitigation. By John B. Taylor. (Concluded from page 430, September 16th Issue.) 436

Prolonging the Life of our Pole Line Timber. By P. J. Howe, (Concluded from page 415, September 16th Issue.) 439

Coming Conventions. 440

A Few Hints Regarding the Adjustment of Telegraph Apparatus. (Continued from page 421, September 16th Issue.) 441

Radio Conference. Click-Click of His Telegraph Key Brings Seemingly Dying Man to Life 442

Radio Interest is World Wide. A Correction 443

First Radio World's Fair. Kolster Radio Compass 444

Telephone Pioneers of America 445

Wireless Waves by Night. Incandescent Lamp Forty-five Years Old 446

Wire Men Scorn Arbitration Award. Miss Mary Cassatt, Losing Her Sight Gives up Painting. To All Cable Users 447

Editorial Comment—An Appreciation and a Few Anecdotes. By J. Frank Howell. 448

The Railroad—Annual Meeting of the Telegraph and Telephone Section of the American Railway Association 451

Postal Telegraph-Cable Company. Western Union Telegraph Company. All America Cables. Dividend Unchanged at 10 per cent 457

Obituary. New York Telegraphers' Aid Society. Last Minute Calls 458

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Effects of Aurora Borealis on Communication Circuits and Means of Mitigation

By John B. Taylor
Consulting Engineer, General Electric Company

(*Concluded from page* 430, *September* 16*th Issue.*)

Telegraph disturbances were experienced on the same day in the greater part of the two hemispheres as reported from Switzerland, Germany, British Isles, North America and Australia.

"In the United States in particular they were so strong that for about two hours it was possible to send messages from Boston to Portland without any battery, using only the telluric current."

The same aurora of 1859 is compared with an aurora of Aug. 3, 1865, by G. F. M. in a letter to the "Boston Journal" Aug. 4, 1865. Referring to August, 1859, he says:

"Several telegraph lines were worked, messages transmitted, etc., without the aid of artifical electricity, the aurora borealis assuming the entire duty of the usual batteries. * * * It was a great satisfaction to many wonder-stricken telegraphers who had never seen the like of it before."

However, the principal point of G. F. M.'s communication on August 3, 1865—Auroral Current—the difference in character of the 1859 and the 1865 disturbances. His 1865 observations were on a line between Boston and Springfield, Mass., and he reports the waves of longer duration (cycles of five or ten minutes) and with a more gradual rise and fall than in 1859, but as still more remarkable—

"The entire absence of the changes in polarity which were marked in 1859, each wave having been almost invariably succeeded by a wave of opposite polarity."

G. F. M. stated further that the western, or Springfield, end of the line was positive on Aug. 3, 1865, which happened to be in opposition to the arrangement of the batteries. Because of his inability to report the magnitude of the earth effects in "volts" or "amperes," he tells that the same galvanometer deflections were given by the auroral currents in the Boston-Springfield line as would be given by 34 cells in the New York-Boston line of No. 8 galvanized wire.

The same characteristic distinction between earth current reversals and pulsating values without change of polarity is shown in a plot of some readings sent me from the office of Mr. E. C. Keenan, General Superintendent of Telegraph and Telephone, New York Central Lines. The date was Aug. 11, 1919: the voltmeter readings taken at New York on a wire grounded at Buffalo.

At about 11:10 A. M. the readings were swinging from about 50 volts positive to the same figure negative in cycles, roughly, two minutes. Ten or 15 minutes later, though the pulsations continued, they were all the same side of zero (Buffalo—, New York+.), the pulsations occurring at intervals of approximately 1 minute.

Angot gives additional dates of notable auroral storms distributing the telegraph service as follows: May 30, 1869; April 5, 1870; October 24, 1870; February 4, 1872, November 17, 1882.

He was writing in 1896, and, in that year characterized the 1872 auroral display and interference with telegraph communication as the most extensive known. Reports from England for that year indicated that the effects were most marked on lines directed east and southeast. At the same time many of the submarine cables were so affected as to prevent the transmission of any messages.

For the aurora of 1882, Angot refers to Sir William Preece as his authority for observations in England of earth currents in the telegraph lines "five times as strong as the current usually employed in telegraphy."

In more recent years and well within the memory of telegraphers who are not "old timers" we may mention auroral storms of the years 1907 and 1915 (June 16th and 17th, a few days before the meeting on June 22nd of the Association of Railway Telegraph Superintendents at Rochester, N. Y.), 1919 (Aug. 11, 12), 1920 (March 22), and 1921 (May).

Compared with the large number of published descriptions of auroral displays and the tremendous amount of astronomical and meteorological observations on sun spots, number and character of auroral displays, atmospheric electrification, compass deviations and strength of earth's magnetic field, there is surprisingly little exact data available on the related currents and pressures in our communication circuits. Nor is this lack to be explained by the comparatively few years since the birth of the electric telegraph.

Magnetic storms or earth current disturbances severe enough to interrupt communication occur unexpectedly and at intervals averaging several years. Without a prearranged testing plan, a disturbance lasting from a few minutes to an hour affords little opportunity for a number of measurements at different stations. Rarely do the interruptions continue more than several hours, and, the longer the time, the greater becomes the pressure to dispatch the accumulating messages. In other words, just as the situation becomes interesting, the circuits cannot well be spared for making a continuous record of directions and magnitude of currents and pressures. The wire chiefs and testing men who might be doing this if relieved from other duties, are, just at the time, busier than ever attempting to find or arrange routes and circuits that will take care of the messages.

In spite of these obvious difficulties in diverting an expensive and busy commercial plant into a research laboratory, much may be learned by careful observation and record of the pertinent factors at the time of these auroral displays and earth current storms. We should assemble a large number of independent observations made coincidentally of current and pressure on widely extended lines of different lengths and running in different direc-

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tions. A critical study of these in combination with records made at the same time at magnetic observatories, and with the reports of visual observers of auroral displays, might help determine which of several theories best represents the true cause and effects.

Some theories of the aurora call for a rain of electrified particles from the sun striking the earth. If such electrified particles struck an insulated overhead wire, it would become charged. An electrometer between line and earth at any point in its length would indicate the same value of pressure or charge. If the wire were connected to ground at one end only, through an ammeter or milliampere meter, this would give a reading twice as high as if the wire were grounded at both ends. Besides, the direction of current flow would be opposite in the two ends of the line, i.e. zero in the middle. Readings of this character are not observed at the time of auroral disturbances, though the charged condition described is often found when certain local atmospheric conditions bring charged particles against an overhead charged wire. These charged particles may be in the form of rain, hail, snow, or dust and sand. Wires which are underground under water or overhead in lead-covered cables do not accumulate charges like the open wires —and yet, such buried submerged or enclosed conducting lines are affected in the auroral storms equally with the open wires. Current flow is observed only where the lines come to earth at the two ends or at separated points. In general, the longer lines give the higher voltmeter readings but do not necessarily pass more current when the circuit is closed, since the circuit resistance is usually proportional to the length.

Speaking of the 1859 aurora, Angot said that the currents manifested themselves in all directions, being perhaps more marked on north and south lines. From reports of 1872, English lines running east and west were the most affected. At other times and places, all the letters of the compass have been given as most susceptible directions.

From the practical telegrapher's point of view, the disturbance has been regarded as a difference of potential between spots on the earth which are separated by a number of miles. This affects the circuits exactly, as if a battery or generator were introduced directly into the earth return portion of the circuit.

When these earth potential differences are small in comparison with battery or generator pressures used on working circuits, they are not noticed, but when the value becomes a substantial part of the working pressure, signals become ragged, uncertain and entirely suppressed or distorted.

If the earth potential differences which accompany the auroras were steady for a number of minutes at a time, it would be possible to compensate for this extra potential by reducing, or reducing and reversing, the pressure of the batteries or generators. But, since the polarity of the earth potential difference often changes from one minute to the next, and because the magnitude of the earth potential difference varies from zero to maximum values in irregular cycles usually of but a few minutes duration, it is often impossible to change the instrument and the battery adjustments rapidly enough to keep up with the earth effects.

The above remarks apply to simple Morse circuits where, except for leakage effects, it is immaterial whether the working battery is concentrated, distributed or in the return part of the circuit. But duplex and quadruplex systems depend on batteries which are balanced in strength and concentrated at special points in the scheme of connections. The introduction of electromotive forces into the circuit at other points, such as the auroral current between the two earth plates, definitely upsets the theoretical scheme of such multiplex lines.

Though it may be immaterial for the wire chief's procedure to know just what is the cause and just where is the location of the auroral electromotive forces, as a guide to further study and experiment, it is proper at this point to discuss several possible causes and locations.

What do we mean by the statement that there is a potential difference between the earth at station M and earth at station Q? Merely that an insulated wire of iron or copper placed above or below the surface of the earth (but close to it) and grounded at the ends, passes a current. This does not tell us whether the electro-motive force setting up the current is in the body of the earth or in the wire, or partly in each.

So far as the wire is concerned, we can fairly well satisfy ourselves that electro-magnetic induction is the only possible cause of electromotive forces in it. Electro-magnetic induction in the adjacent earth of the same sign and value as in the wire would not prevent flow of current through return in earth at greater depth or by a surface circuit not subject to the same inductive influences.

The earth portion of the circuit is not so simply disposed of. Chemical and thermal effects may be mentioned but dismissed as unlikely. The passage of current in the surface of the earth from causes and points beyond the stations M and Q might set up a difference of potential between M and Q due to earth resistance drop, in which case the line from M to Q would be merely a supplementary path, or in shunt with the earth from M to Q. In this case, the currents in the earth from M to Q would be in the same direction as current in the line from M to Q. Our century-old method of using a compass or magnetic needle to settle which way current is flowing in the earth cannot answer this question easily. For, while it has long been known that the compass needle moves at the time of auroral storms, this fact has been taken by some scientists as basis for calculating the value of current in the atmosphere as evidenced by the luminous aurora seen overhead. Thus, Birkehead estimates auroral currents at several hundred thousand to a million or

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more amperes at heights of one hundred to two hundred miles.

If the auroral storms brought tremendous currents from atmosphere to ground in some parts of the earth with a return circuit to atmosphere at some other point on the earth's surface, there would be a potential gradient over the surface of the earth depending on the dstribution of current as determined by resistance of water, land, and interior structure.

However, to account for pressures reported in the lines, these currents between air and ground would have to be many millions of amperes—and the meteorologists' observations of the electric state of the atmosphere at the time of auroras, as well as at other times, do not support such a theory of current flow.

An induction theory would appear more reasonable if the time elapsing between earth current swings of opposite polarity was shorter, or if we did not have the reports indicating persistance of the same polarity. While it is theoretically possible to set up and maintain by induction a steady current for a considerable or indefinite time, to realize this, we must assume that the primary inducing current increases and continues to increase at a rate leading before long to unthinkably high values.

Because of our present time and space limitations, this line of speculation must be dropped after merely adding the thought that the surface velocity of the earth in its rotation; the much higher velocity of the earth as a whole in its orbit around the sun—not to mention other possible motions against unknown streams of electrified particles in space —may make the earth and our telegraph wires comparable to the revolving armature of a generator. A satisfying solution of this problem may await only the collection and coordination of additional data. In this study, the telegraph lines appear as an important contributing element.

We have already classified the aurora and accompanying earth currents as "natural" phenomena, which means that we cannot overcome the disturbance by any attack on the primary cause.

It is a singular coincidence that the maximum observed values of the earth currents are so nearly of the same order as the normal working currents in our typical telegraph lines. Doubtless many minor disturbances due to auroral earth currents are overlooked or attributed to other causes, so that the practical disturbing problem presents itself only at a time of auroral or earth current storms of the first magnitude. If these disturbances occurred more frequently or continued longer than several hours to a day ,the system of connections and scheme of operation would long since have been modified. Witness the Atlantic and other submarine cables which, employing weak currents and sensitive instruments, would be at all times disturbed by earth currents except for the practice introduced by C. F. Varley of working through a condenser. This condenser device is equivalent to allowing the cable recorders to work either side of a displaced zero, with the extent of the displacement determined by the earth potential difference at the two ends. Usually this earth potential difference changes gradually, and a slight leakage will dispose of the accompanying charge, but when the rate of change of the earth potential difference is quite rapid, it distorts or interrupts the signals.

The submarine cable equipment and operating practice might be applied to land telegraph lines, but doubtless all will agree that auroral earth current interruptions occur too seldom to justify having cable apparatus in reserve with operators trained to make the substitution at short notice for a few hours. A metallic return circuit free from earth connections appears to be the most obvious and practical suggestion to meet the majority of earth current storms. Some difficulty may be experienced and some ingenuity required to quickly adapt switchboards, batteries, generators, etc., to an emergency metallic return circuit. Obviously, this cannot be done where a paralleling wire is not available, and, at the best, the number of working circuits is greatly curtailed.

Further, the typical duplex circuit is not arranged to permit working with metallic return, which fact still further reduces the amount of business that may be handled. In extreme cases, even the complete metallic circuit may fail. If the earth potential differences are high enough to break over the lightning arresters, this will be the case. C. H. Wilson, in speaking of auroral disturbances at the 1915 meeting of Railway Telegraph Superintendents, reported that the auroral storm of 1907 burned out lightning arresters on metallic circuit telephone lines. This might indicate potential differences in the neighborhood of 500 volts. Apparently such pressures are quite exceptional, other reports and voltmeter readings generally running to figures not above 200 volts.

When the earth currents are of moderate strength, if the line insulation will stand it and extra batteries or generators are available, the earth current may be swamped sufficiently to permit operation by a substantial increase in the working current.

Finally, those systems of telegraphy which depend on alternating currents, whether of the phonoplex type or latest forms of high frequency "carrier" current, can be worked through condensers and need not provide a path for the disturbing auroral currents. The choice of such alternating current systems, however, is likely to be determined by other considerations than interruptions of auroral storms. Their advantage in this respect is an additional point, but perhaps not of sufficient weight to be controlling.

SUMMARY

Coincidence of many observations on sun spots, auroral displays, compass deviations, and earth currents in telegraph lines indicate relations with many theories variously assigning causes and effects.

Except in the case of the submarine cables, such earth current disturbances to the telegraph have

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ot been sufficient to determine choice of apparatus r system of connections.

Metallic circuits and certain forms of alternating urrent telegraph are substantially free from earth urrent disturbance.

The majority of simple single-wire telegraph ines can best meet a case of auroral disturbance by educing the fluctuations of line current (practically accomplished by increase of batteries or generators), or by temporarily changing to metallic ircuit.

Prolonging the Life of Our Pole Line Timber

By P. J. Howe
Construction Engineer, Western Union Telegraph Company, New York

(*Concluded from page* 415, *September* 16*th issue.*)

I have devoted considerable time to describing the several pole treating plants of the Western Union because many questions have been asked about them and no complete information has heretofore been published. It will be evident from the figures which have been given, that these plants have a total treating capacity close to 270,000 poles a year, or roughly two-thirds of our annual requirements. In addition to this supply of treated poles, it is also possible to have poles treated at commercial treating plants, and many treated poles have already been obtained from this source. However, it is an expensive matter to ship poles from various sources all around the country to a few centralized treating plants, and probably there will always be many poles which it will not be economical to ship to centralized plants. If, therefore, the life of these poles is also to be prolonged, it must be brought about either through the means of semi-portable treating plants that can be used, at the source of supply or on the job where the poles are used, or by means of some sort of treatment that can be applied right in the field, where and when the poles are set. This brings us back to the subject of brush treatments, or else to some form of treatment which can be substituted for them. It is the belief of the writer that such a method of treating has been developed, but as it fits in with the next portion of this talk, its description will be taken up a little later.

If man, in general, devoted all his efforts to building his new industries, his machines, his railroads, his homes, etc., as good and as lasting as he could, and spent no thought or effort in keeping his existing plants in shape to operate, his engines to run, and his homes to live in, it would not be long before the world would be a pitiful and sorry place for us all. In other words, we must always get the utmost service out of what we have, before we discard it for the new. And so it is, in the writer's opinion, with the pole line plants of the railroad and telegraph companies. Why not make them last as long as they possibly can? We paint our homes every few years, and they last to serve several generations of occcupancy. Is there any reason why we should not at least try to make the poles, which we already have, last as long as possible? Certainly, extending the life of those seven million or more poles that we now have is a task really worth setting ourselves to.

The problem, then, that faces us is as follows: we have poles of all ages, sizes and kinds, scattered far apart, all over the country, in all sorts of soil, on all sorts of right-of-way, and in all sorts of climates. They are all in use and cannot be disturbed. Most of them are perfectly good above ground. Most of them, also are more or less decayed at the ground. Some are so far gone that they must be replaced this year or next. Some will last quite a few years more. Still others, on the other hand, are comparatively new, in fact, almost as good as new, or at least only beginning to be attacked by decay. These are what we have—the material which we have to work on.

In a way, the solution of our problem looks comparatively simple. There are just three things to be done. First, existing decay must be removed. Second, decay must be stopped and all existing decay and decay germs and organisms killed. Third, further decay must be prevented by making all wood which new decay organisms might reach, immune from such decay. How completely these things can be accomplished depends on the nature of the existing decay and how carefully and thoroughly we do the job.

Some kinds of timber, particularly the white cedar, when placed in sandy or other porous soil, is much subject to heart rot, starting from the middle of the pole at the bottom and gradually working upward and outward until the pole becomes weak and ready to fall. If such poles had been tank treated before they were set, it is possible this decay might have developed, but when untreated poles begin to fail in this manner, there is apparently no economical way of stopping it.

The above condition, however, is not the rule. Most poles require replacement on account of outside decay at the ground line. This makes the problem much simpler, as the decay can be removed by shaving. And by the method developed by the Telegraph Company, the writer believes it can be definitely stopped and further decay prevented for quite a number of years. We call our field treatment the charring and spraying treatment, and after much experimentation and development of apparatus, have begun to use it widely throughout our plant. The method has been in practical use for about a year, but we really have only begun. It will take a long time to make the round of our two hundred odd thousand miles of pole line, and by the time we get through, we will probably have to start again on the second round.

The first step in the treatment of a standing pole is to excavate the earth from around the pole to a depth of a foot or so, depending on the extent of decay, and then remove and shave off all decayed

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wood down to solid timber. The pole should then be allowed to dry out thoroughly for two or three days. The next step is to still further dry out the pole and open up all checks and cracks so there will be little likelihood of further checking, and then to sterilize the wood and kill all remaining decay and its organisms. This is done by burning, a large kerosene torch being used. The flame is directed particularly into checks and cracks, and finally produces not only a considerable sterilized pole, but also a condition of seasoning that is probably as complete as will ever be reached. It has also produced an outer layer of charcoal which will not resist decay, but will serve a still more useful purpose, as will be explained later.

Immediately after the charring, and while the wood is still hot and its cells and contained air and vapors completely expanded, the preservative agent, creosote oil, is applied in the form of a hot, fine, high pressure spray. The spraying outfit consists of a specially designed sprayer, much like a fruit sprayer, except that it is equipped with a special thermometer, spray nozzle, pressure relief valve, etc. The creosote is applied under a comparatively high pressure, and penetrates far into all cracks and crevices. In fact, the heated condition of the pole greatly facilitates this penetration, as the contraction of the wood cells and the air and vapor in and around them tends to create a vacuum and draw in the oil, just as is the case in the alternate hot and cold bath open tank treatments. This is where the charring above referred to serves its special purpose and contributes to the effectiveness of the treatment. The charcoal is very porous and hence acts much like a sponge, taking up an excess of creosote oil and storing it for subsequent absorption by the wood itself. The spraying is continued until the oil no longer enters the pole, but runs off to the ground, leaving the pole black and wet with creosote.

The treatment is now finished, but the earth should not be filled in for at least a day or so, or until the oil now held in the charcoal has had time to penetrate further into the wood. Immediately back-filling would cause the excess oil to go into the earth, where its effects would not be so beneficial, instead of into the pole.

As to the results obtained by the charring and spraying process, it may be said that the penetration is unusually good for a superficial treatment. It must be remembered that as the poles have been in service several years, they are invariably well seasoned, and, except for such soil moisture as they may have absorbed, are in ideal condition for treatment. In fact, they take treatment much better than new poles, which are not already seasoned. It is not at all unusual for charring and spraying treatments on old chestnut poles to fully equal open tank treatment on new poles of the same species. Not enough experience has yet been obtained with cedars to permit a definite comparison with open tank treatments, but as open tank treatments give a much greater penetration in cedars than in chestnuts, it is not to be expected that any superficial treatment of short duration can be as good.

In this discussion of charring and spraying treatments, we have been thinking only of old poles, the ones which we already have. But mention was made sometime ago of the many new poles which it will be impracticable to have tank treated and which must be set either without treatment or with treatment applied at the time of setting. This is where the charring and spraying treatment once more offers possibilities. When the poles are set, the earth need not be entirely filled in, and consequently, the charring and spraying treatment can be applied very much more cheaply than on old standing poles, and quite effectively. This treatment, however, must not be considered as a complete substitute for the longer and better open tank treatment, but it unquestionably will be effective and will prolong the life of the poles for several years, at least.

As a closing thought, I can do no better than to once more call your attention to the picture that I drew of the millions of poles standing out there in the prairies, fields and mountains, and then to that other picture of the vast beautiful forests which have gone forever, in giving us these poles, and finally to those few remaining forests which keep shrinking and disappearing, in their efforts to supply our needs. It takes years to make a tree and only God can make it, but man can do his best to save it. Let us ponder over it a while and each of us, in our own small way, lend our influence and our efforts toward a cause that is surely worth all we can give it.

Coming Conventions

Old Time Telegraphers' and Historical Association, Hotel Roosevelt, New Orleans, La., October 30th, 31st and November 1st.

Telephone Pioneers of America, Chicago, October 10th and 11th.

The Most Sought After Electrical Book on the Market

"Pocket Edition of Diagrams and Complete Information for Telegraph Engineers and Students," by Willis H. Jones, offers the most complete study of the telegraph ever published. This standard text-book has been revised and brought up to date, and in addition to numerous diagrams and complete information covering the study of the telegraph, includes full descriptions of the newest apparatus adopted by the Western Union and Postal Telegraph companies, and describes the equipment of a modern telegraph office. This valuable book, with its 488 pages, 250 illustrations, and carrying an appendix of 24 pages and 16 illustrations covering the new Western Union Multiplex System, is the most sought after electrical book on the market. $2.50 per copy. Address and make remittances to Telegraph and Telephone Age, 253 Broadway, New York.

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Few Hints Regarding The Adjustment of Telegraph Apparatus.

(Continued from page 421, September 16th Issue)

ADJUSTING FOR MAXIMUM STRENGTH

Place a sheet of paper between the armature and e poles of the sounder magnet and then lower the ormer till there is just space enough to move the per back and forth without catching. This permits ie magnet to exert its maximum strength on the ver and the position should seldom be altered. Vhatever changes that are necessary during the pro- ess of adjusting should be effected by means of the oring, the upper thumbscrew, and the screws which egulate the trunnion. The adjustment of the trun- ion screws is a matter too generally overlooked. It there that the pitch, or quality, of the sound is egulated. The pivot must not bind too tightly nor e too loose.

LOCATING A FAULT

What is most important to the operator, however, s to be able to quickly determine by the nature of he annoyance the source of the disturbance and hen apply the correct remedy.

When signals do not reach the operator in the articular style that suits his fancy he usually at- empts to remedy the fault by giving the sounder ever a greater or a lesser play. If the trouble hap- ens to lie in an improper adjustment of that part f the apparatus he may possibly succeed in helping natters, but the fact is that indistinct signals may e due to a great variety of causes, any one of which ie may never suspect.

For the purpose of illustration let us again take he case of an ordinary single line relay and sounder nd assume that despite a careful adjustment of he relay and sounder magnets after the manner uggested the signals continue to "drop out" at imes.

Now, the first thing to determine is whether the fault lies in the relay or the sounder. Such disturb- ances are usually due to a loose or improper connec- tion somewhere in the local circuit, but not always. Naturally, the first move made towards locating the trouble should be to examine all binding posts, and operators in general would save themselves many annoyances if they would acquire the habit of do- ing this whenever they sit down to a different set of instruments If the binding post connections prove to be secure, open the key and "dot" or "write" with your finger on the relay armature or lever using the latter as a key. If the signals then respond firmly and distinctly, the local circuit is not at fault and attention should be directed to the relay.

In many cases the source of the trouble will turn out to be too tight an adjustment of the trunnion binding posts, thus preventing the restrained arm- ature from responding readily to the influence of the magnet. This fault, when it exists, is particularly emphasized on circuits in which the strength of the current flowing through the relay coils is weak. Where the main line current is strong, the magnet is frequently able to overcome this drawback, but it is evident that even then the working margin of that instrument has been cut down to the extent that the trunnion binds. It follows, then, that the trunnion binding posts should always be so ad- justed that the cross bar or axis upon which the lever and armature rest may move perfectly free in its sockets.

If, however, on another occasion, the signals made in the manner suggested continue to drop out despite this test, the fault may possibly be found in a loose connection somewhere in the lo- cal circuit. If tightening the binding posts fails to remove the trouble, examine the fine wire wound around the shaft of the relay lever, one end of which is attached to the shaft and the other to a part of that trunnion binding post where the local battery current makes its exit. If this wire be- comes broken the sounder signals will certainly "drop out" at times owing to the loose connection made between the shaft and the post as the former turns in the socket. The purpose of the fine wire is to bridge over this imperfect connection in the local circuit, and the operator will at once see the necessity of keeping the wire connection intact.

When a sounder stands "open" and it is desired to ascertain if the break in the local circuit lies in some of the relay connections, place the blade of a knife across both local binding posts, situated just behind the relay spring. If the break is in that instrument the sounder will then close. If the latter remains open, try the same method with the two posts of the sounder itself. If the coil or wire connections there are broken a spark will be noticed the moment the blade makes and breaks contact with the two posts. The sounder, however, will not close, because the magnet coils are short- circuited.

The knife blade method, however, should never be resorted to where sounders are connected in multiple, such as is usually the case in large mod- ernly-equipped offices, because the short-circuiting of the coil draws so much current through the low resistance route through the blade that it melts the fuse and opens the other four or five companion sounders included in that particular group. Oper- ators see this fact demonstrated nearly every day in large telegraph offices when some one thought- lessly or ignorantly permits a steel penholder or other piece of metal to make simultaneous con- tact with both binding posts of the sounder or re- sonator connections. When this occurs the "locals" go off on several adjacent desks and business is suspended until a new fuse is substituted. The blade may be placed across the local posts of the relay, however, because it will not short-circuit the coils of the magnet, hence the resistance is not lowered. It may also be done where the sounder coils are in series with a loop or lamp resistance, such as the arrangement obtaining on duplex and quadruplex circuits.

It will be seen from what has already been said that the adjustment and understanding of even an ordinary relay and sounder requires considerable

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skill and a fair degree of electrical knowledge, yet an operator who does not possess ambition enough to interest himself to the extent of understanding the instrument before him, certainly deserves many of the needless provocations which come his way.

ADJUSTMENT OF SENDING APPARATUS.

Up to this point the suggestions concerning various methods of adjusting telegraph apparatus have been confined to the receiving instruments. The sending apparatus, however, demands quite as much attention and skill on the part of the operator as the receiving instruments do.

Operators, as a rule, hardly realize the fact that it lies within their power to not only make their own work much easier, but also that of the man at the distant end of the circuit.

One of the most common mistakes the operator makes is to find fault with the key frequently because of his inability to send fast, or to make the Morse alphabet easily. It may surprise many readers to learn that, as a matter of fact, the key is seldom to blame. The trouble is really due to what may be called the electrical and mechanical inertia of the instruments.

For example: On a telegraph wire where there are a great many offices close together, such as we find on some railroad circuits, there are necessarily many relays, the highly-wound coils of which compose the greater part of the total resistance. Where such a condition exists the counter-electromotive force developed within and by the coils is so great that it checks the quick action of the current in its operation of building up the magnetism in the iron cores of the relays, and thus demands a slower rate of speed on the part of the sending operator in order to fully form his characters. Unless he complies with this law the second impulse in the formation of a character will be begun before the preceding one has been fully "built up," with the result that the key will "stick," as he erroneously believes, and the key gets the blame.

With sounders, as usually arranged, the case is different, but the effect is just the same. If you give the lever of a sounder an abnormally great degree of play, and then rapidly make "dots," the lever will probably remain in an "open" position during the experiment. Decrease the speed somewhat and it will respond indifferently. If, however, you open and close the key very slowly the lever will follow the movement faithfully. Finally, if you adjust the lever armature close to the magnet and give it but very little play, every "dot" will be heard no matter how rapidly they are made.

The lesson to be learned from these experiments is that where speed is required the lever must be given as little play as practicable in order to reduce the mechanical inertia to a minimum. Where an operator ignores this rule in order to get a greater volume of sound to receive by, he will experience the same difficulty in forming the alphabet as his friend with the choked relay did, and probably vie with him in condemning the greatly abused key.

The application of these lessons is directed principally to those in charge of duplex and quadruplex apparatus, and cautionary to operators in branch offices working sounders on legs or loop extensions. On account of the tongue and the retractile spring on transmitters and the accuracy with which polechangers must be manipulated, those instruments demand very careful adjustment to the speed of the transmitting operator. Sounders, on the other hand, once properly adjusted, respond so clearly (on the transmitting side) that operators in branch offices working on duplex loops find that the sending side works, apparently, as well on a poor wire as on a good one. The result is that in bad weather the fact is frequently overlooked that the polechanger or transmitter, as the case may be, cannot perform its functions properly at a dry weather speed, and operators by thus maintaining their usual speed cause no end of trouble both to themselves and the quadruplex chief at the main office.

Radio Conference

In response to an invitation extended by Secretary Hoover, Dr. Frederick A. Kolster, Chief Research Engineer of the Federal Telegraph Company has been nominated to represent the Point to Point and Marine Commercial Interests at the Third National Radio Conference, according to an announcement made recently by Ellery W. Stone, President of the Federal Telegraph Company.

Mr. Stone and Dr. Kolster left for Washington on September 25, to attend the conference which convened September 30.

Dr. Kolster is considered as highly competent to represent these interests having been associated with the development of Radio Telegraphy since its infancy. The Kolster Decremeter and the Kolster Radio Compass and Position Finder are among Dr. Kolster's many contributions to radio.

Click-Click of His Telegraph Key Brings Seemingly Dying Man to Life

The ticking of his private Morse code call at an instrument by his bedside restored to consciousness J. T. Phelan, superintendent of the Dominion Telegraph Company, Vancouver, B. C., after he had been in a comatose condition nearly a week.

Phelan was ill for weeks following the death of his wife and had been unconscious six days, attending physicians disclosed. On the suggestion of a physician an instrument was installed by Phelan's bedside and "PN," his private call, ticked off.

Phelan smiled and opened his eyes when the ticker announced "Every day in every way."

Then the ticker suggested that Phelan drink a little milk. Phelan reached out his hand for the glass and took the first nourishment in six days.

He was reported convalescent on September 16th.

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Radio Interest Is World Wide

WHILE the activity in amateur radio work and n broadcasting is still greater in the United States han in any other nation, the past year has brought bout marked changes in the situation in many oreign countries, according to the Electrical Di- ision of the Department of Commerce. Today, ew are the nations which have not recognized the opular and growing interest in radio by the enact- nent or revision of regulations of one sort or nother.

Naturally, the development abroad has had its greatest growth in Europe. In the British Isles, France, Germany, Sweden, Switzerland, Holland, Belgium, Denmark and Czechoslovakia, the broad- casting of programs of entertainment and news is on a rather regular basis while in Italy, Finland, Spain and Austria, programs are sent out at ir- regular periods with a decided likelihood of regular schedules being adopted in the no great distant future. In other countries of Europe there has been some sale of long range sets to pick up British and French stations.

In South America, Argentina stands out as hav- ing made the greatest progress in the dissemina- tion of music and other entertainment by radio tele- phony, with Chile also maintaining regular broad- casting service. For a time, regular services were also maintained in Brazil and will, undoubtedly, be re-established in the course of time. Uruguay, as a result of broadcasting from Buenos Aires, has shown a considerable interest in radio, and in Peru arrangements are going forward looking toward the establishment of regular service.

. Australia and New Zealand have each displayed much interest in the new art and in view of the recent lifting of hampering regulations in Australia a marked expansion in radio interest in that coun- try may be looked for. In the Orient, little has as yet taken place, though India and Ceylon are open- ing up, and intermittent broadcasting is being pro- vided. In Japan, adequate legislation has been en- acted, making provision for the establishment of broadcasting stations, but little progress has taken place. In China, radio is technically barred under an embargo forbidding the entry of anything usable as war material, though in the British port of Hong- kong and in the international settlement of Shang- hai, some broadcasting has been done.

In no foreign country is the use of radio receiv- ing sets as free and unrestricted as in the United States. Even in Canada users of receiving sets must pay a nominal license fee therefor, while in some countries the restrictions imposed and the li- cense fees assessed are onerous.

While most of the countries, which have enacted legislations on radio telephony during the past year or two, have established certain wave bands, not varying widely from that in this country, which must be used for private broadcasting, not a little of the European broadcasting is at wave lengths greater than those in use in the United States and for which American sets are designed.

Designed as a rule for the wave band provided for broadcasting in this country, American radio sets and certain parts, have been handicapped to some extent in certain foreign markets. On the whole, however, it may be expected that the situa- tion as regards wave lengths will tend to improve and that there will be less and less handicap from this quarter.

The interest shown by plantation owners, mine operators, ranchers and the like in the interior of India, Ceylon, Central America, South America, Australia and parts of the East Indies is sufficient to indicate that the field is there. In part of course, the potentialities of these fields cannot be developed until better broadcasting is provided at points within a distance that can be regularly and reliably covered by a good modern set. However, in the case of sections, such as Central America, Northern South America, the West Indies and even many of the Island goups of the South Seas, the high class American set will today enable the isolated planter or mine operator to reach some of the more power- ful American stations.

Manufacturers and exporters, however, have be- come so accustomed to having the merits and possi- bilities of radio well understood by the potential buying public, as a result of the immense publicity given radio by the press of this country, that they lose sight of the fact that men in outlying regions, in little touch with the newspaper press and hav- ing little contact with anyone who knows radio at all, do not themselves appreciate fully its possibili- ties. To develop the use of radio, therefore, in these outlying sections some method must be de- veloped whereby effective demonstrations can be given. It should not be difficult to arrange for such demonstrations and it is believed that they will be amply justified by the returns that will be received.

A Correction

Editor:—

I HAVE just been reading the article on page 390 of your September 1st issue, "KDKA'S Signals Have World Wide Range." As a matter of ac- curacy I wish to call your attention to an error in paragraph four in which it is stated that the call letters of the Canadian Government Ship Arctic are "VIM."

We have frequently received signals from this vessel on a special short wave receiver built in our radio laboratory and the call letters used are "VDM."

Your article contained a very interesting account of this vessel's operations and construction.

Yours very truly,

M. E. PACKMAN,

Vice-President and Director, Radio Laboratory, Dodge Telegraph Institute, Valparaiso, Ind.

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First Radio World's Fair

THE entire radio fraternity—inventors, manufacturers, dealers, broadcasters and fans—are expectantly awaiting the first Radio World's Fair which is to open in Madison Square Garden and the 69th Regiment Armory on September 22nd and continue until September 28th.

The coming exposition, which has been the talk of the wireless industry for the past year, will include de luxe exhibits by one hundred and sixty-four nationally known American companies and twenty-five or more of the most famous radio manufacturers of Europe and Japan.

The exhibits, occupying 126,000 square feet of floor space, will completely fill both huge buildings, to which there will be but one admission charge.

The Radio World's Fair will be the largest and most complete commercial exhibition ever assembled in America and it is practically a certainty that the attendance will break all New York trade show records. One recognized authority estimates that the Fair will be patronized by at least a quarter of a million people.

The booth and decorative equipment is said to be the most elaborate ever built for an American trade show of any sort. A noted architect, several famous artists, and a score of scenic designers and builders have devoted six months to it's production, which was accomplished in the famous Sam Asch Studios.

In addition to elaborate manufacturers' displays, in which all participating companies will introduce their very latest models, there will be many unusually interesting novelty exhibits. Among these will be a "New Inventions Department," a "Practical Miniature Model Exhibit" and an "Amateur Set Builders' Contest."

Special studios will be established in the Garden and Armory by Stations WHN, WEAF, the new A. H. GREBE Station and possibly Station WNYC, from which feature programs will be broadcast every afternoon and evening.

Several thousand jobbers and dealers from all parts of the world will attend the big show and two hours a day, from 11 A. M. to 1 P. M., have been set aside for the exclusive transaction of business between these wholesale buyers and the exhibitors. The doors will be open to the general public from 1 P. M. to midnight daily. By special arrangement, the exposition will remain open Sunday afternoon and evening, September 28th, for the benefit of the new Neuropathic Hospital.

A number of leading radio trade organizations will hold their 1924 conventions in New York during the week of September 22nd and arrangements have been made to conduct their most important business meetings in the lecture halls and demonstration auditoriums of the Armory and Garden during the morning hours.

Four special trains will bring manufacturers, dealers and enthusiasts from distant points in the United States. The new Radio Manufacturers Association, of which Herbert H. Frost is President and Chas. H. Porter, Executive Secretary, is coming from Chicago on a specially chartered twelve car limited.

Many scientific, social, commercial, political and military notables will be among the guests of honor on the opening night. They will be entertained by a Reception Committee composed of officers of the Radio Manufacturers' Association, the Associated Manufacturers of Electrical Supplies and the National Broadcasters' Association.

Representatives of several important international financial groups have arranged to begin surveys of the radio industry at the first Radio World's Fair and if they are duly impressed with the commercial possibilities of the new science, the radio business will soon be established on a sound financial basis, similar to the automobile industry.

Messrs. James F. Kerr and U. J. Hermann, General Manager and Managing Director of the big show, have already made definite arrangements to stage annual international wireless expositions in New York and Chicago, until 1934 at least. They have taken exclusive ten year leases on the famous Chicago Coliseum and the New Garden, soon to be erected in New York by John Ringling and Tex Rickard, and it is barely possible that a Pacific Coast city will be included in their Radio World's Fair circuit next season.

Kolster Radio Compass

A deal has just been closed with the Sperry Gyroscope Company which makes the Sperry people exclusive agents in China and Japan for the Kolster Radio Compass, according to an announcement made by Ellery W. Stone, President of the Federal Telegraph Company, at San Francisco, Calif., manufacturers of the radio compass.

This follows recognition of the fact that the radio compass is one more indispensable adjunct to safe navigation and its use in conjunction with the Sperry Gyroscopic Compass makes an ideal combination for safe navigation in all weather. This dual arrangement has already been installed on several domestic ships and both the Sperry Gyro Compass and the Kolster Radio Compass and Position Finder are rapidly taking their places of importance in maritime circles throughout the world.

The day is not far distant according to Mr. Stone, when every lighthouse and lightship will be equipped with a radio beacon for use in conjunction with the Kolster Radio Compass and no ship will be without this compass.

Many installations have already been completed and those who will sail the seas in ships equipped with these devices may do so in greater safety than has ever before been possible.

ANNOUNCEMENT was made at the Department of Commerce on September 16th, that the date for the Third National Radio Conference has been set for Monday, October 6th, instead of September 30th, as was recently announced.

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Telephone Pioneers of America

THE Transportation Committee of the Telephone Pioneers of America, believing that the successful trips arranged in the past years to the Annual Meetings have added largely to the pleasure of those attending, and desiring that this year's arrangement should maintain its established standard, has arranged with the New York Central Railroad for a personally conducted tour on all-expense plan which we are sure will meet with the approval of all our members.

The tour has been arranged including all necessary expenses except while in Chicago. The route and schedule as outlined in the itinerary is of a most interesting and attractive character.

The party will leave New York from Grand Central Terminal in special train stopping at 125th Street Station for the convenience of those living in upper New York City, thence proceed direct to Chicago.

If sufficient Pioneers from Buffalo take advantage of the trip, a sleeping car will be placed for occupancy at Buffalo 10:00 P. M. and attached to special train. Pioneers from Rochester can also secure space in this car.

Pioneers from Southern New England Companies territory will be assigned to sleeping car space from Springfield.

HOMEWARD BOUND

The homeward journey will commence at 5:00 P. M., October 12th, and our only stopover will be at Niagara Falls, at which point the famous Gorge Route trip will be made.

An experienced representative of the New York Central Railroad will accompany the party throughout the trip to look after the details en route.

B. A. KAISER,
R. H. STARRETT,
Transportation Committee.

ITINERARY

WEDNESDAY, OCTOBER 8TH

Lv.	New York (G. C. Term.)	6:00 P.M.
	125th Street	6:10 P.M.
	Albany	9:40 P.M.
Lv.	Boston	2:00 P.M.
	Worcester	3:14 P.M.
	Springfield	4:33 P.M.
Lv.	Utica	11:50 P.M.

THURSDAY, OCTOBER 9TH

Lv.	Syracuse	1:20 A.M.
	Rochester	3:00 A.M.
	Buffalo	5:00 A.M.
Ar.	Chicago	5:00 P.M.

SUNDAY, OCTOBER 12TH

Lv.	Chicago	5:00 P.M.

MONDAY, OCTOBER 13TH

Ar.	Buffalo	7:15 A.M.
Lv.	Buffalo	7:25 A.M.
Ar.	Niagara Falls	8:15 A.M.

At Niagara Falls the party will make the famous Gorge Route trip, passing Horseshoe Falls, Niagara Falls, Ont., Whirlpool Rapids, Brock's Monument, Queenston and Lewiston.

Lv.	Niagara Falls	1:00 P.M.
	Buffalo	1:50 P.M.
Ar.	Rochester	3:13 P.M.
	Syracuse	4:50 P.M.
	Utica	5:52 P.M.
	Albany	7:50 P.M.

TUESDAY, OCTOBER 14TH

Lv.	Albany (B.&A.R.R)	12:15 A.M.
Ar.	Springfield *	3:35 A.M.
Ar.	Worcester	5:15 A.M.
Ar.	Boston	6:30 A.M.

*** Pioneers in Springfield cars may remain in same until 7:00 A. M.**

MONDAY, OCTOBER 13TH

Lv.	Albany	8:00 P.M.
Ar.	New York	11:00 P.M.

Below are the names of those who will have charge of the sale of tickets for Special Train:

For NEW ENGLAND, excepting Connecticut:
F. J. BOYNTON, *Secy.*
Thos. F. Sherwin Chapter No. 14
50 Oliver Street, Boston, Mass.

For CONNECTICUT:
F. P. LEWIS, *Secy.*
Morris F. Tyler Chapter No. 9
157 Church Street, New Haven, Conn.

For NEW YORK and NORTHERN NEW JERSEY:
R. H. STARRETT, *Secy.*
195 Broadway, New York City.

All checks should be made payable to Secretary selling tickets.

To CHICAGO AND RETURN FROM	One Person In Lower Berth	One Person In Upper Berth	Two Persons In Compartment Each	Two Persons In Drawing Room Each	Three Persons In Drawing Room Each
New York	$83.88	$80.20	$91.38	$98.50	$87.50
Albany ...	71.28	67.90	78.40	85.15	74.90
Utica	63.92	60.69	70.67	77.04	67.29
Syracuse ..	59.93	56.92	66.30	71.92	62.92
Rochester..	51.85	49.59	56.34	61.59	54.59
Buffalo ...	44.48	42.22	48.97	54.22	47.22

To CHICAGO AND RETURN FROM	One Person In Lower Berth	One Person In Upper Berth	Two Persons In Compartment Each	Two Persons In Drawing Room Each	Three Persons In Drawing Room Each
Boston ...	$85.51	$81.45	$93.75	$102.00	$89.75
Worcester .	83.11	79.05	91.35	99.60	87.35
Springfield	78.32	74.64	85.82	92.94	81.94
Hartford via Springfield	79.71	76.03	87.21	94.33	83.33
New Haven via Springfield.....	81.68	78.00	89.18	96.30	85.30
Providence via Boston	87.89	83.83	96.13	104.38	92.13

ACCORDING to the latest available figures, New York City has more telephones than any foreign country except Germany.

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Wireless Waves by Night

SIR:—In a recent address at Rome Senator Marconi announced that the experiments made by himself and Engineer Franklin, of the Marconi Company, has proved the "fact that free wireless waves, if sent from Poldhu, England, in the morning, reach Australia via the Atlantic and Pacific Oceans, covering in all a distance of 22,000 kilometres, while if they are sent in the afternoon or evening they travel over Europe and Asia, and cover a distance of only 17,000 kilometres."

Senator Marconi mentions this notable result as an unexplained curiosity of wireless phenomena. Let me point out in your valuable paper that in the "Astronomische Nachrichten," No. 5044, p. 73, Kiel, in the first paper on the "New Theory of the Ether," April, 1920, I have carefully explained the greater power for sending radio messages via the night hemisphere of the globe and the lesser power for sending such messages via the daylight or illuminated hemisphere. My explanation and the observations which confirm it are as follows:—

It is well known that magnetic and gravitational waves noticeable upon the earth are continually radiated from the sun. American radio observers assured me over four years ago that these waves from certain sunspot areas often have a length of 2,000 metres. These waves may be actually observed and have been carefully studied by Observer Fanning and others, experimenting at Lick Observatory in conjunction with the Radio Towers near San Francisco. I recommended the further study of these waves to the United States Navy Department several years ago, and such observations have been in progress.

In the illuminated hemisphere of the earth these invading solar waves are strongest; in the dark or night hemisphere they are damped and enfeebled by bending around and passing through the solid body of our globe. Hence the night hemisphere of the earth has a quieter ether than the day hemisphere; it is less churned up by the passing commotion by night than by day. Hence transmission of radio waves is easier and more effective by night, and the wave takes the direction of the night hemisphere.

Here is a valid physical analogy confirming this interpretation of the easier communication of radio waves by night. Imagine a river or channel, say a mile wide, and suppose we wish to transmit across the channel water waves such as might be produced by the vertical motion of a large piston in the water. If the surface of the water is calm every wave will go through to the opposite shore and be perfectly distinct. The message conveyed by the waves through the undisturbed medium could be interpreted and would be perfectly clear. But if a violent storm be raging, so that the surface of the river or channel is torn by very conflicting motions, the artificial waves made by our piston will have great difficulty in getting through the storm-swept surface with sufficient distinctness to be regular or intelligible. In such a storm the artificial water waves will be lost, or reduced to irregularity and indistinctness, by the interference of the storm waves.

Now what the storm waves are for the water the magnetic and gravitational waves are for the ether field of the illuminated hemisphere of the earth; the radio waves, under the complicated churning up of the sunlight field, have great difficulty in getting through, whereas they pass easily through the night field owing to the damping of the sun's magnetic and gravitational waves in passing through and around the globe to the shadow of the earth.

Thus we have a simple and satisfactory explanation of the different behavior of radio waves in the morning and afternoon noted by Senator Marconi and his engineer. The waves from England to Australia pass via the night or dark hemisphere of the globe because the quiescence of that hemisphere, due to the damping of waves radiated by the sun, enables the radio waves to get through with distinctness.

The analogy here drawn from the behavior of waves in water is perfectly applicable to the ether field used in wireless telegraphy. It may be verified in any channel in the world, and is confirmed by experiments in the theory of sound. It thus rests on true laws of nature. Accordingly there is no doubt of the correctness of the interpretation of this phenomena in the "New Theory of the Ether," 1920-22, which first explained the cause of magnetism and of universal gravitation, with new and very simple laws, resembling that of Newton, connecting these two chief forces of nature.—Yours, &c.,

T. J. J. See, Captain United States Navy, Government Astronomer. Naval Observatory, Mare Island, California, August 18.

Incandescent Lamp Forty-five Years Old

WITH the electrical industry celebrating the forty-fifth anniversary of the birth of the incandescent electric lamp, and the annual Electrical Exposition holding forth in New York, the last week of October will be an important period in local electrical circles.

The first successful incandescent lamp was made by Thomas A. Edison on October 21, 1879, after months of research and experiment in his laboratory at Menlo Park, N. J., and three years later, September 4, 1882, electric lighting was introduced commercially in New York. The anniversary of the great inventor's achievement is always observed by the electrical industry and this being the forty-fifth birthday, special plans are being formulated. Prominent among these plans will be the observance of Edison Lamp Day at the Electrical Exposition in New York. The exposition will be held at the Grand Central Palace from October 15 to 25th and the twenty-fifth which occurs on Tuesday, will be marked by a number of special features. There will be a historical display showing the development of electric lamps from Edison's first laboratory products to the high efficiency lamps now in use. It is expected also that many of the Edison Pioneers will attend the exposition and of course Mr. Edison himself will be invited.

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Wire Men Scorn Arbitration Award

UNION news telegraphers employed by the United ress, International News Service, and Universal ervice rejected a wage award made by an arbi- ator appointed by the department of labor that anted the wire men an increase of a dollar a week ch year for the next year, and, recently on orders om the president of the Telegrapher's Union, the erators began taking a strike vote. The manage- ents of the three press associations announced that ey would stand uncompromisingly on the arbi- ator's award.

The award was delivered, and was accepted by e representatives of the press associations. Hywel avies, of the Department of Labor, was the arbi- ator, appointed by the secretary of labor upon the int requests of the managements and the union ommittee. After hearings and investigations last- g two weeks he recommended the following ward:

"A three-year contract, with an increase in wages or all classifications of one dollar a week for the ear July 1, 1924, to June 30, 1925; another dollar week increase from July 1, 1925, to June 30, 1926; nd a third dollar increase, from July 1, 1926, to une 30, 1927."

In addition, he recommended that two weeks' va- ations with pay be continued.

The news agencies issued a statement giving their ttitude, in which they said:

"In addition to accepting the award of the arbi- rator, the managements offered to adjust the pay on ll matters not covered in that award. They agreed o increase the wage for special Saturday night work from $8.50 to $9.50 for receiving operators and from $10 to $10.50 for Morse relay operators for the first year, with corresponding increases later. They agreed to add ten cents an hour to all overtime pay- ments in all Morse classifications, and 7½ cents on printers, with a corresponding increase for each year of the contract.

"They also agreed to add one more holiday and to pay double time for all overtime on both holi- days. They also agreed to an increase of $4 on top of the award figure for night relay operators in San Francisco and Washington."

Miss Mary Cassatt, Losing Her Sight, Gives Up Painting

THREATENED with blindness and therefore no longer able to take an interest in painting, Miss Mary Cassatt, sister to the late Alexander J. Cassatt, former president of the Pennsylvania railroad, opened an exhibition on March 3rd, of all her works at a Paris gallery. Hitherto she has refused to sell her pictures, but she has now decided to dispose of all and to retire either to the suburbs of Paris or live in New York.

Miss Cassatt came to Europe in 1875, to study art, devoting her attention first to Velasquez's work in Spain. and subsequently to that of Maet and Degas at Paris. She has frequently been represented in imprissionist exhibitions but never in the Salon, though she is known as one of the most eminent women artists and has been called by Clemenceau "one of our artist glories." Ten years ago she sold a pastel of Philadelphia to the city of Paris for $820,000, but she is best known for her portraits of women and children, which have been exhibited at Durand-Ruel's, both in Paris and in New York, where she showed her paintings in 1898 and 1923. In her pictures the influence of the three major artists whose work she has studied is apparent, besides which, in her color etchings, there is often a Japanese quality.

Miss Cassatt was born in Pittsburgh. Her father was also a Pennsylvania Railroad official. Although her career has been achieved in Paris she has never relinquished her claim to being an American. Her early studies were pursued at the Academy of Design in Philadelphia, where probably she received her only conventional training, and later she studied also in Holland and Italy, acquiring in the latter country a feeling for a Madonna-like interpretation in her paintings of lower class women. She has worked in all mediumspastel, crayon, dry point and oils.

To All Cable Users.

EXPERIENCE has shown us that most code users are skeptical about new codes. They either do not want to "waste" time looking at them, or "bother" about changing old systems. Yet every foreign trader has at some time or other, and even now, realized that the old standard codes are obsolete.

Twenty years ago the old standards filled requirements. Times have changed—and so has trading—but codes did not change.

Ten months ago the Acme Commodity and Phrase code was published. To improve on the old codes and to bring cabling up to its highest point of efficiency has been the aim of the publishers. The best proof that they have succeeded is the fact that the "Acme" first edition is already sold out and the second is on the press.

In every foreign country where the "Acme" has been inspected, it has been adopted by the leading firms. We consider this one of the best recommendations as we all know that foreign firms are very conservative in adopting new codes.

In these days of keen competition every expense must be considered. If the "Acme" can reduce your cable bills, as well as give you what experts declare to be the safest code words yet published, would you be willing to examine same?

Why not write us for a copy on approval? This places you under no obligation whatsoever, and we feel certain that a few minutes examination will convince you that the "Acme" is the most up to date code on the market.

Address Telegraph and Telephone Age, 253 Broadway, New York.

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EDITORIAL COMMENT

An Appreciation and a Few Anecdotes

By J. Frank Howell

The death of Dennis F. Brown, lessens the ranks of the old timers more than the individual loss; it brings to mind the apparent swiftness of the harvester of time. To speak of him as one of the greatest characters of our time is by no means flippant. He was a first class telegrapher and developed into a first class switchboard chief operator with a wonderfully charitable disposition. During his telegraph days, he was called upon to fit in many places that proved this.

In his earlier days, when the racing association was at odds with the telegraph company, he was called upon to fill in some mighty interesting and intricate niches on the race course, such as watching and flashing the returns from the tree tops just outside of the track. In none of his experiences did it ever seem to make a dot's difference in his makeup and disposition. He was always kind and cheerful whether in the society of "Skate" Donahue, Joe Barley or a cub operator. His disposition was not a nomadic one, although he had much to tempt him, but preferred to stick to New York as long as possible, finally going to Washington, where he joined the Society of Joab and gradually worked up to a high office in that organization, where much good was done for other less fortunates.

During Denny's New York career, he saw all the celebrities and their various idiosyncrasies come and go. During this time he was a familiar sight in his long linen duster as he would run out across the street for his ambrosia, winter and summer. After he went to Washington, illustrative of Denny's humor, a saloonkeeper got into the brokerage business and consequently became mixed up with a lot of crooks—Denny said he hoped the courts would be gentle in dealing out justice, as he used to serve a very good free lunch. He was very fond of playing the races and one time when crossing the street he stumbled in front of a wagon. Denny said he wasn't hurt, that the horse was likely one that he had so often played.

His annual vacation was spent in calling on as many of his old time friends as possible. He was looked for regularly as the time approached. He was happy as a lark when off duty, and furnished a round of jollity. He was witty without the satire that so often follows. His voice was soft and well modulated, by no means boisterous.

In later years, when I would go to Washington, I would never forget to have Denny call at the hotel when off duty and take dinner with me and likely go to a theatre. He would walk up and down before the glass looking himself over and never fail to ask how I thought he looked. He was not a handsome man and I used to tease him by saying: "Denny you certainly are the most conceited man of my acquaintance"—later I would say: "You look so well you are good for one hundred years and don't let any one kid you." He would then say: "Thank you, Frank, I appreciate this from you."

In his young days at 195, he and Maurice Brick had the first call on most of the "Scoops". Cash Scoops were very much in demand as they could frequently be juggled a bit especially with new operators desirous of subbing. In those days, pay days were every two weeks, quite a length of time to finance oneself. I was working Savannah wire nights, and generally right on time. Peter J. Morrison, worked the wire days, and generally managed to slide out ahead of my arrival. Denny would spy the wire empty and sit in. When I would come in he would say I thought you were going to be a few minutes late and I would sit in for you. In a few minutes he would whisper, could I lend him 25c.

He was very resourceful. There was a well known money lender who would trust up to $5., and sometimes to the very select and prompt $10. Denny got behind in his payments and could not borrow any further. In great desperation one night, Denny slided up to the M. L. and got into conversation ,during which he inquired very anxiously after his daughter's health, she had been sick, and when in the right humor proceeded to make a touch, which was successful.

It was the installment tailor's custom to call regularly every pay day for his allowance. One day Denny not being ready for the tailor anticipated the occasion by giving Finnegan, the doorkeeper, a cheap cigar to tell the tailor he was not on duty that day. This was one of his best jokes.

Time did not apparently mean much to Denny in his earlier days, when he would get interested in the saloons and blind tiger hangouts, which were numerous in the vicinity of 195, and he would not think of this until about time for the last Fulton Street ferry boat. To miss this meant the missing of the old horse line street car schedule for East New York, which made the distance seem much further than it really was. One night, Denny was running down John Street, the shortest route for the ferry at a great speed, when he run right into a new "cop", who held him up for explanation of his hurry. He was delayed such a time as to miss his boat and finally prevailed upon the "cop" to go back with him to see Night Manager Sink for identification. Mr. Sink said he did not recognize him. Then a great pow wow ensued, and the policeman released Denny at a late hour.

These were the experiences of youth so to speak, nothing vicious, and were all lived down and well repaid by many acts of charity on his part.

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A SPLENDID ELECTRICAL LIBRARY

Hawkin's Electrical Guide contains ten wonderfully helpful and practical volumes, written in clear, concise language, easy to understand, no wasted words, full up-to-the-minute electrical knowledge, which can be applied to problems that come up from day to day. You can carry a number of the books with you until you have mastered the subjects. All subjects are indexed so that you can find the information instantly. Written in the modern question and answer form. It's like having an electrical authority always at your elbow ready to answer any question you ask. 4700 pictures, 3500 pages, pocket size, flexible cover; price $10.00 for the full set of ten books. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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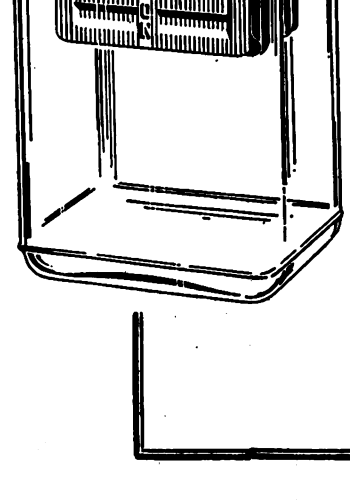

Standby Life

Edison Primary Batteries have an indefinite standby life. On the shelf or in any open circuit, Edison Cells are always resting because of the small amount of internal chemical reactions.

Yet, when called upon for real action, Edison Primary Batteries are always on the job, doing the work they do the best—supplying a dependable source of energy for Telephone Service.

Edison Cells last about twelve times as long as dry cells, supply a uniform voltage throughout their entire rated life and will give more dependable service at a lower cost than any other form of battery energy.

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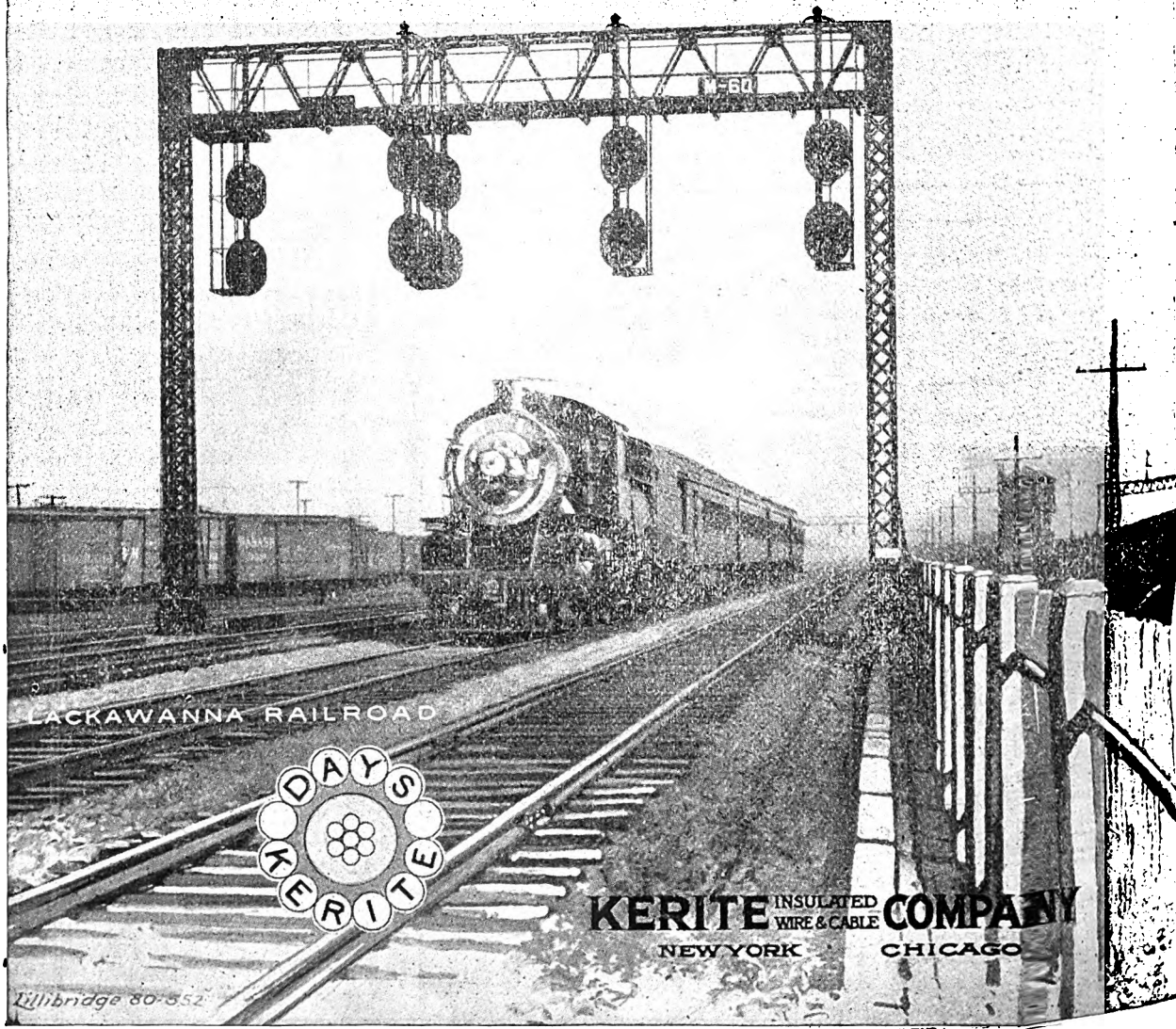

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THE RAILROAD

nnual Meeting of the Telegraph and Telephone Section of the American Railway Association

THE Eighth Session, Annual Meeting, of the elegraph and Telephone Section of the American ailway Association, was held at the Chateau Fronnac, Quebec, P. Q., on Tuesday, Wednesday and hursday, September 9, 10 and 11.

The attendance was as follows:

Representatives of members: 104 representing 00 memberships.

Affiliated members: 36; Visitors: 25.

The meeting was called to order by I. C. Forshee, hairman, who is Telegraph and Telephone Engineer of the Pennsylvania Railroad System, Philaelphia, Pa., on Tuesday, September 9th at 9:30 .M. The program which was printed in the issue f August 16th, was strictly adhered to.

The following address of welcome was made by Iis Worship, Joseph Samson, Mayor of the City of Quebec:

Gentlemen:

"On the occasion of the Convention of the Telegraph and Telephone Section of the American Railway Association, I feel greatly honored as Mayor of Quebec, in extending to you all the most ordial welcome to the old City of Quebec.

"We highly appreciate the honor you have conferred upon us by selecting Quebec as the seat of our important meetings.

"Knowing since long the useful and tiresome work performed by the devoted telegraph operators who are always on duty in order to strengthen the bonds which tie the whole world together, I have great pleasure in wishing you the greatest success and I sincerely hope that, between your numerous meetings, you will have enough time to enjoy yourselves and visit our historical monuments.

"May you fully enjoy the attractions of our City and, before leaving, I would kindly ask that you promise me to come back to the dear old Quebec."

The following letter from R. H. Aishton, President of the Association was read:

"I have delayed answering yours of the 31st ultimo, and the 12th instant, hoping that I might find an opportunity to accept your most cordial invitation to attended the Annual Meeting of the Telegraph and Telephone Section at Quebec, but I find that my time is all taken up from September 5th to 28th and it is going to be impossible for me to get away from Washington or New York during that period.

"I know that you will have a most interesting meeting in the most interesting city on the American continent. My best wishes go to all of you for a most successful convention."

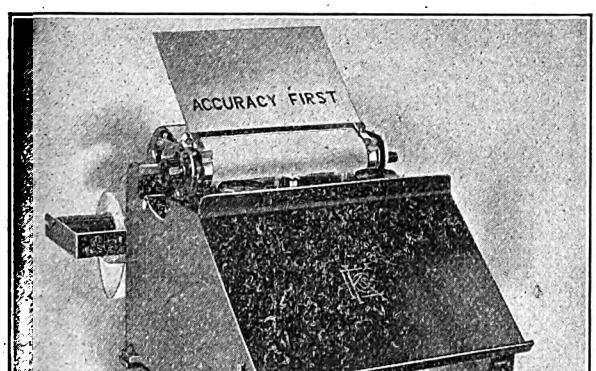
The following telegram from H. Hulatt, Chairman of the Section, during the year 1921, was read:

"The most successful yet is my wish. May you all have a good time in God's Country."

The following Committee reports were discussed and action taken as indicated:

Report of the Committee of Direction covering the actions of the Section since the Colorado Springs,

EVERY USER IS A KLEINSCHMIDT BOOSTER



ONE CUSTOMER WRITES:

We are having little or no trouble with our machines. One man is taking care of twenty Telegraph Typewriters and he devotes part of his time to other matters.

ANOTHER WRITES:

We wish to advise you that your Telegraph Typewriters are working fine and doing everything you guaranteed them to do. We find the system one for efficiency and an asset to our working organization.

A THIRD WRITES:

Both machines gave excellent service and had hard usage as the test work is sometimes rougher than regular work on good lines.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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Colo., meeting in September, 1923, was presented as information.

Report of Committee No. 1—Construction and Maintenance—Outside Plant, outlining the work of its various Sub-Committees during the past year was presented as information.

Report of Sub-Committee "A"—Construction and Maintenance of Pole Lines, Wires and Cable, covering fifteen subjects and containing ten exhibits was discussed at length and the following actions taken on the exhibits:

Instruction for the Maintenance of Outside Telegraph and Telephone Plant, accepted for submission to letter ballot for inclusion in the Manual.

Instructions for Splicing Paper Insulated Lead Covered Cables presented for discussion.

Specification for Creosoting Timber used in the Telegraph and Telephone Plant, accepted for submission to letter ballot for inclusion in the Manual.

Specification for Hard-Drawn Bare Copper Line Wire and Specification for Annealed Copper Tie Wires, presented for discussion.

Specification for Galvanized Iron Line Wire and Specification for Galvanized Iron Tie Wires, presented for discussion.

Specification for Galvanized Steel Guy and Messenger Strand presented for discussion.

Notes on Use and Ordering of Types "H" and "L" Paper Insulated Lead Covered Cable presented as information.

Specification for Leather Body Belts and Safety Straps presented for discussion.

Report of Sub-Committee "B"—Wire Crossings presenting Part III—Underground Crossings of the Specifications for Telegraph, Telephone and Other Communication Wires and Cables Crossing the Tracks of Steam and Electrified Railroads, was accepted for submission to letter ballot for inclusion in the Manual.

Report of Sub-Committee "C"—Underground Construction, presented as information.

Report of Sub-Committee "D"—Transpositions, presented as information.

Report of Committee No. 2—Construction and Maintenance—Inside Plant, relative to the work of the Committee being assigned to sub-commitees was presented as information.

Report of Sub-Committee "G"—Apparatus, Material and Tools, was acted upon as follows:

Specification for Lead Sheath Office Cable with Quads of Cotton or Silk and Cotton Covered Enameled No. 18 A.W.G. conductors was accepted for submission to letter ballot for inclusion in the Manual.

Specification for Rosin Core Solder ARA-1-A, was accepted for submission to letter ballot for inclusion in the Manual.

Specification for Metal Boxes, was accepted for submission to letter ballot for inclusion in the Manual.

Specification for Friction Tape ARA-1-A, presented for discussion.

Report of Sub-Committee "H"—Locations and Layouts, presented as information.

Report of Sub-Committee "J"—Circuits and Current Supply was acted upon as follows:

Wire Chief Switchboard Circuits, accepted for submission to letter ballot for inclusion in the Manual.

Specification on Power Survey, accepted for submission to letter ballot for inclusion in the Manual.

Instructions for Telephone Maintenance, accepted for submission to letter ballot for inclusion in the Manual.

Report of Sub-Committee "K"—Installation and Maintenance, presented as information.

Report of Committee No. 3—Protection Against Electrolysis, presented as information.

Report of Committee No. 4—Electrical Protection. Exhibit A, Notes on the Protection of Radio Equipment Installed in or on Railroad Property was accepted for submission to letter ballot for inclusion in the manual.

Report of Committee No. 5—Telegraph and Telephone Development containing articles on the following subjects was presented as information:

Preservative Treatment of Standing Poles.
New Loaded Ocean Cable.
Single Circuit Protection Switchboard Units.
Instrument Fuses.
Cordless Table Jacks.
Unit Repeater Table Equipment.
Concentration Cabinet—Relay Offices.
New Tests Set for Use on Radio and Wire Carrier Systems.
Improved Circuit Scheme for High Frequency End of a Composite Ringer.
New Polar Telegraph Relay.
Combined Distributing Frame and Coil Rack.
Coil Rack for Termination of Cables.
Wire Chases in Concrete Floors.
Electrolytic Rectifier.
Two Channel Printers.
Pole Mounts.
"CX" Resistor.
Automatic Telephone Dial.
Snap Switch Motor Starter.
Forge Steel Pin with Lead Head.
Way Station Loud Speaking Outfits.
Current Supply Set.
Enclosed Switches on Face of Power Panel Units.
Equipment Trains with Radio Receiver Sets.
Power Control Panels in Unit Sections.

Comparative Statement showing use of Telegraph and Telephone in Transmitting Train Orders as Reported by Interstate Commerce Commission.

In connection with the report of Committee No. 5—Telegraph and Telephone Development, the Chairman, J. A. Jones, General Superintendent of Telegraph, Southern Railway System, requested the members to keep him informed, on the latest developments in telegraph and telephone apparatus and practices likely to prove of interest and value to the Section.

Report of Committee No. 6—Message Traffic. Reports on the following subjects were presented as

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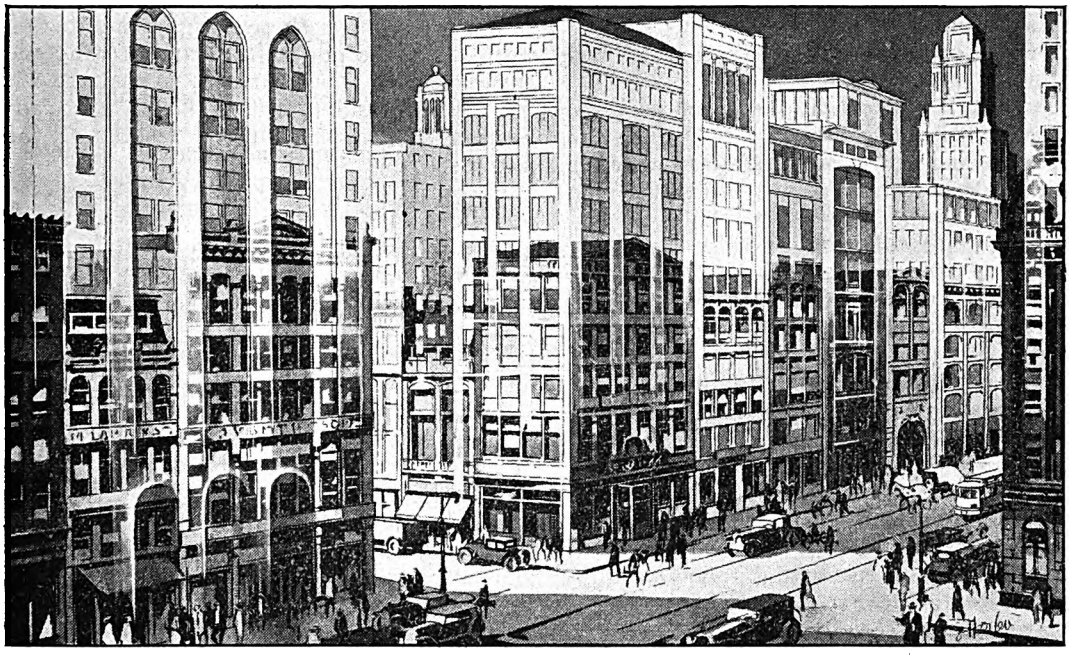

To-morrow's Telephones

So vital a factor has the telephone become in American life that the demand for it would undoubtedly grow even without increases in population. New businesses are founded; others expand. New homes are established in town and city, in suburban dwellings and apartment houses.

To meet the needs of America, to-day and to-morrow, with the best and cheapest telephone service, is the responsibility of the Bell System. The telephone will grow with the population and prosperity of the country, and the plans of to-day must anticipate the growth of to-morrow.

The service which is given to-day was anticipated and provision was made for it, long in advance. Money was provided, new developments were undertaken, construction work was carried through on a large scale. The Bell System, that is, the American Telephone and Telegraph Company and Associated Companies, has continuously met these requirements. It has enlisted the genius of technical development and the savings of investors for investment in plant construction.

Over 315,000 men and women are owners of the American Company's stock and over half a million are investors in the securities of the System. With a sound financial structure, a management which is reflected in a high quality of telephone service, the Bell System is enabled to serve the increasing requirements of the American public.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES

BELL SYSTEM

One Policy, One System, Universal Service

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information:

Question of obtaining impression or hectograph copies of incoming telegraphic correspondence, the kind of ribbons, etc.

Establish a unit railroad telegram.

Establish speed of service and routine instructions governing.

Make a study of traffic conditions in relay offices, with a view to devising some plan to reduce the peak-load period, and, with the cooperation of other departments, endeavor to arrange for a more even distribution of the load.

Consider advisability of using aeroplane mail service for handling telegraphic traffic.

Use of automatic printing telegraph for handling light traffic loads on railway circuits and for interdivisional message service.

Substitution of telephone circuits for handling local division message business.

The following subject was accepted for submission to letter ballot for inclusion in the Manual:

Suggestions to effect economies and savings in telegraphing of railway associations and bureaus.

Report of Committee No. 7—Inductive Interference, containing discussions on the following subjects was presented as information:

Telegraph and Telephone Protectors.

Adjustment of Operating Current of Telegraph Circuits.

Insulation of Telegraph and Telephone Circuits.

Avoidance of Common Ground Connection for Power and Communication Circuits.

Resonant shunts, filters and Drainage Coils.

Carrier Circuits.

Shielding Conductors.

Report of Committee No. 10—Education and Training of Telegraph and Telephone Employees, presented as information.

Report of Committee No. 11—Telegraph and Telephone Transmission: The following recommendations of this committee were accepted for submission to letter ballot for inclusion in the Manual:

Requirements for Efficient Railroad Telephone Transmission.

Recommended Practices Beneficial to Railroad Telephone Transmission.

Data on Transmission Equivalents of Railroad Telephone Apparatus and Circuits, including the necessary instructions regarding the Use of Same.

Standardization of Transmission Unit.

Committee No. 11 also submitted A Discussion of the Choice of a Transmission Unit as information, and Requirements for Efficient Railroad Telegraph Transmission for discussion.

Report of Committee No. 12—Radio and Wire Carrier Systems. The Committee presented reports on the following subjects for the information of the Section:

Continue to keep in touch with manufacturers of wireless equipment and endeavor to have actual demonstrations made of the possible applications which already have been suggested.

Continue studies of the feasibility of securing carrier current telegraph and telephone operation over existing typical railroad wire plants in the present state of the art.

Make report on these assignments to the Chairman of the Section at the earliest convenience on any conclusive developments, so that the Chairman may, if he considers it desirable to do so, advise the Section immediately of the results of the Committee's study.

Encourage and cooperate to the fullest extent, consistent with railroad practices, with manufacturers and others in developing a simple reliable carrier or wireless telephone set that will talk and signal between the rear and head of both freight and passenger trains.

Consider the feasibility of establishing radio communication to be used in emergency when all other means of communication have failed.

Keep in touch with the proposed establishment of a permanent Board of Radio Control and any other legislative activities affecting the status of railroads with respect to the application of radio.

Committee No. 12—Radio and Wire Carrier Systems also presented a Supplementary Report at the Session covering a recapitulation of the activities of the Committee and the status of development of special apparatus for application to railroad service.

In addition to the foregoing reports the following papers were presented:

A. C. Mil-Ammeter Method of Testing Open Wires by R. T. Davenport, Plant Supervisor, Postal Telegraph-Cable Company.

Effects of Aurora Borealis on Communication Circuits and Means of Mitigation, by John B. Taylor, Consulting Engineer, General Electric Company.

Machine Switching, Private Branch Exchanges and Their Application to Railroad Service, by W. H. Harrison, Central Office Engineer, American Telephone and Telegraph Company.

Prolonging the Life of Our Pole Line Timber, by P. J. Howe, Construction Engineer, Western Union Telegraph Company.

The Detection and Location of Trouble on Telephone and Telegraph Circuits, by H. S. Osborne, Transmission Engineer, American Telephone and Telegraph Company.

From the foregoing it can be seen that an interesting and instructive session was had and the lengthy and valuable reports of the Committees reflects their earnest endeavors during the past year.

The following officers were elected for the ensuing year:

CHAIRMAN

G. D. Hood, Superintendent of Telegraph, Chicago, Rock Island & Pacific Railway.

FIRST VICE-CHAIRMAN

H. A. Shepard, General Superintendent Electric Transmission and Communication, New York, New Haven and Hartford Railroad.

SECOND VICE-CHAIRMAN

J. A. Jones, General Superintendent of Telegraph,

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thern Railway System.

The following members of the Committee of ection were elected for the ensuing year:

V. P. Cline, Superintendent of Telegraph, Atic Coast Line Railroad.

E. E. Dildine, Superintendent of Telegraph, rthern Pacific Railway.

P. F. Frenzer, Superintendent of Telegraph, ion Pacific Railroad.

. C. Johnson, General Superintendent of Teleph, Pennsylvania Railroad System.

. McMillan, Manager of Telegraphs Canadian cific Railway.

M. O. Scobee, Superintendent of Telegraph, ading Company.

The Committee of Direction for the ensuing year ll consist of the foregoing officers and members d the two Past Chairmen of the Section.

The following Committee on Nominations was ected for the ensuing year:

A. W. Douglas (Chairman), Assistant Superintendent of Telegraph, Chicago, Rock Island & acific Railway.

A. W. Flanagan, Superintendent of Telegraph, outhern Pacific Company.

G. W. Jett, Superintendent Telegraph, Norfolk nd Western Railway.

John Miller, Telegraph and Telephone Engineer, orthwestern Region, Pennsylvania Railroad System.

G. R. Stewart, Telegraph and Telephone Engineer, Illinois Central Railroad.

The Committee on Resolutions, consisting of Messrs. E. C. Keenan of New York, A. W. Flanagan of San Francisco, Cal., A. P. Linnell of Toronto, Ont., anl W. D. Neil of Winnipeg, Man., resented the following resolutions, which were nanimously adopted.

WHERAS, Due largely to its being held in the eautiful and historical City of Quebec, and the delightful and efficient cooperation of the Canadian uthorities and members, this Annual Session has een one of the most successful meetings of the Telegraph and Telephone Section of the American Railway Association; Therefore Be It

RESOLVED, That the Section express its appreciation and thanks to the foregoing and all others contributing to the work that has been so successfully carried on. Mention is made of the following:

His Worship, Joseph Samson, the Mayor of Quebec City, for his very warm welcome and extension of the hospitality of the City.

The Chateau Frontenac for its most excellent accommodations, entertainment and many courtesies.

The Canadian Pacific Railway, including the Telegraph Department, for its many attentions and practical services.

The Canadian Pacific Steamship Company for the excellent entertainment and luncheon on its palatial Steamship the Empress of France.

The Canadian National Railway, including its Telegraph Department, for the services, entertainment and general accommodations.

The Canada Steamship Lines, Ltd., The Pullman Company, and the Quebec Railway, Light and Power Company for courtesies extended.

W. H. Harrison, Central Office Engineer, American Telephone and Telegraph Company for his paper entitled "Machine Switching Private Branch Exchanges and Their Application to Railroad Service."

P. J. Howe, Construction Engineer, Western Union Telegraph Company for his paper entitled "Prolonging the Life of Our Pole Line Timber."

R. T. Davenport, Plant Supervisor, Postal Telegraph-Cable Company for his paper entitled "A. C. Mil-Ammeter Method of Testing Open Wires."

H. S. Osborne, Transmission Engineer, American Telephone and Telegraph Company, for his paper entitled "The Detection and Location of Trouble on Telephone and Telegraph Circuits."

John B. Taylor, Consulting Engineer, General Electric Company for his paper entitled "Affects of Aurora Borealis on Communications Circuits and Means of Mitigation."

The Railway Telegraph and Telephone Applicance Association for the excellent entertainment provided for the members, ladies and guests.

To the Officers, Committees, Sub-Committees and Affiliated Members of the Section for valuable work contributed.

WHEREAS, Since the last Annual Meeting of the Section, death has called to their reward:

G. A. Cellar, General Superintendent of Telegraph, Pennsylvania Railroad System.

P. W. Drew, Former Secretary and Treasurer, Association of Railway Telegraph Superintendents.

E. Entelman, Superintendent of Telegraph, Southern Pacific Company, and

WHEREAS, Through their passing the Section realizes that it has sustained a very serious loss, not only in its work and activities where their presence was always helpful and inspiring, but also in its personnel, as the association with these gentlemen covering a considerable number of years had endeared them to us all, Therefore Be It

RESOLVED, That the deep sympathy of the Telegraph and Telephone Section be extended to the families of the deceased in their bereavement.

The Committee of Direction held a meeting on Sunday, September 7th, at the Chateau Frontenac at which were present Messrs. I. C. Forshee of Philadelphia; H. A. Shepard of New Haven; R. F. Finley of Cleveland; J. H. Brennan of Springfield, Mo.; J. F. Caskey of Bethlehem, Pa.; E. E. Dildine of St. Paul, Minn.; P. F. Frenzer of Omaha, Nebr.; J. D. Jones of Philadelphia, Pa.; and W. Rogers of St. Louis, Mo.

At this meeting the Committee approved the report of its Special Committee amending the Regulations of the Section to provide for Railway Affiliated Membership available to persons in the employ of a railroad member and not eligible as representative of member. A charge of three dollars per annum will be made to Railway Affiliated

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Members to cover the cost of printed matter distributed by the Commitee of Direction.

Other matters of routine nature were also disposed of.

The Committee of Direction elected at the session held a meeting immediately following the adjournment of the Session on Thursday afternoon, but owing to the absence of G. D. Hood, Chairman, on account of being ill, decided to hold in abeyance the appointment of Committees and assignment of work until such time as Mr. Hood can attend a meeting of the Committee. This included the selection of a place for the 1925 Annual Meeting.

Those present were:

Albany, N. Y.—A. H. Rice.

Boston, Mass.—A. R. Belmont, R. R. Stackpole, F. P. Brennan.

Bethlehem, Pa.—J. F. Caskey.

Buffalo, N. Y.—D. C. Daley.

Bay City, Mich.—W. H. Ogborn.

Baltimore, Md.—C. A. Plumly, B. F. Thompson.

Brewster, O.—P. Vliet.

Bloomfield, N. J.—E. W. Brown.

Cleveland, Ohio—A. Behner, R. F. Finley, L. M. Hitchie, A. E. Pratt.

Chicago—E. A. Burkitt, A. W. Douglas, F. H. Kahl, G. H. Mayer, John Miller, G. R. Stewart, F. T. Wilbur, C. A. Worst, J. O. Carr, W. L. Cook, J. H. Dunn, L. A. de Berard, G. H. La Porte, C. E. Stryker, J. A. Hamilton, Ray E. Hall, A. H. Morse, E. L. Adams.

Carthage, N. Y.—L. H. Jenks.

Cincinnati, Ohio—E. M. Pence.

Charlotte, N. C.—J. E. Smith.

Decatur, Ill.—J. P. Church.

Dallas, Texas—F. P. Gillespie.

Denison, Texas—R. A. Hendrie.

Detroit, Mich.—W. A. Jackson, J. J. Ross.

Denver, Colo.—F. A. Cannon.

Fort Worth, Texas—S. P. Asper.

Greenville, Pa.—F. W. Smith.

Garwood, N. J.—E. S. Berry.

Houston, Texas—Percy Hewett.

Indianapolis, Ind.—C. S. Rhoads, G. T. Stanton.

Joliet, Ill.—E. L. Callahan.

Jersey City, N. J.—C. H. Gaffeney.

Kansas City, Mo.—Roscoe Hooper.

Louisville, Ky.—J. T. Shivell.

Moose Jaw, Sask.—D. Coons.

Memphis, Tenn.—W. R. Crockett, D. C. Walker.

Montreal, Que.—E. A. Cunningham, S. L. Elliot, H. S. Ingram, J. McMillan, John Mitchell, Thos. Rodger, E. L. Scott, R. A. Boyles, J. E. Macpherson, A. Dwight.

New Haven, Conn.—C. D. Briggs, H. A. Shepard, A. A. Goodyear.

New Castle, Pa.—J. C. Hanrahan.

Newark, N. J.—G. Gort.

New York City—L. B. Folley, E. C. Keenan, S. L. Van Akin, L. S. Wells, E. V. Adams, A. T. Baldwin, F. W. Bayles, Wm. H. Capen, Martin H. Clapp, G. W. Janson, J. J. Ghegan, S. S. Hertz, G. K. Heyer, P. J. Howe, B. A. Kaiser, P. W. Mille J. F. Moran, G. A. Nelson, J. P. O'Donohue, A. Reiber, S. W. Goulden, J. B. Taltavall, J. Warre Young Warren, M. Craft, Chas. E. Davies, D. Day, D. P. Dickie, Chas. E. Graham, J. W. Hacket Randolph Leedom, A. G. F. Lockwood, H. McChesney, H. S. Osborne, P. G. Pendorf, J. Underhill.

Norfolk, Va.—W. F. Williams.

Omaha, Nebr.—P. F. Frenzer.

Pittsburgh, Pa.—L. Behner, G. A. Dornberg, A. Lee, W. M. Post, E. W. Stephens.

Patterson, N. J.—R. H. Corson, F. H. Menagh.

Philadelphia— J. H. Ditch, I. C. Forshee, M. Greenmayer, J. C. Johnson, J. D. Jones, W. Logan, P. A. Rainey, J. R. Theiss, T. R. F. Pe ton.

Portland, Me.—J. B. Norcross.

Quebec, P. Q.—D. H. Barclay, J. F. O'Brien, D. Blondin, Louis Belcourt, J. F. Gagnier, Ralph McDunnough.

Richmond, Ind.—C. K. Boles.

Richmond, Va.—J. A. Gleason, P. C. Omohundr

Roanoke, Va.—G. W. Jett.

Reading, Pa.—E. P. Laird, L. D. Shearer.

Sudbury, Ont.—D. H. Bowen.

St. Louis, Mo.—G. E. Bradley, J. C. Browne, B. Pry, Worth Rogers, C. E. Wynne.

Springfield, Mo.—J. H. Brennan, C. H. Willian son.

St. Paul, Minn.—E. E. Dildine, A. S. Harris.

San Francisco, Calif.—A. W. Flanagan.

St. John, N. B.—A. C. Fraser.

Schenectady, N. Y.—J. B. Taylor, C. C. Bailey.

Topeka, Kansas—H. C. Chace, J. Matthews, D C. D. F. O'Hern.

Toronto, Ont.—E. Kenward, A. P. Linnell, W M. Thompson, L. I. Parminter.

Trenton, N. J.—G. W. Shoester.

Terre Haute, Ind.—F. H. Van Etten.

Uniontown, Pa.—W. N. Hartman.

Winnipeg, Man.—E. H. Goodfellow, W. Marshal W. D. Neil.

Washington, D. C.—A. H. Johnson, J. A. Jones.

Committee No. 1—Construction and Maintenanc —Outside Plant, held a meeting at the Chateu Frontenac on Monday, September 8th, at which wer present, Messrs. E. C. Keenan of New York; H. A Shepard of New Haven, Conn.; C. D. Briggs o New Haven, Conn.; E. A. Burkitt of Chicago; D P. Dickie of New York; G. A. Dornberg of Pitts burgh, Pa.; R. F. Finley of Cleveland, Ohio; A. W Flanagan of San Francisco, Cal.; M. R. Greenmaye of Philadelphia; J. C. Johnson of Philadelphia; J McMillan of Montreal, Que.; J. L. Niesse of New York; C. A. Plumly of Baltimore, Md.; and L. S Wells of New York; L. Behner, Pittsburgh, Pa.; and R. Leedom of New York.

Committee No. 2—Construction and Maintenanc —Inside Plant, held a meeting at the Chateau Fron tenac on Monday, September 8, at which were pre ent Messrs. W. Rogers of St. Louis; G. R. Stewart

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f Chicago, Ill.; E. V. Adams of New York; A. Behner of Cleveland, O.; R. H. Corson of Patterson, N. J.; A. W. Douglas of Chicago; John Miller f Chicago, Ill.; J. P. O'Donohue of New York; C. H. Williamson of Springfield, Mo.; and H. W. Drake (represented by G. W. Janson of New York).

Committees Nos. 1 and 2 at their meetings considered the comments and criticisms received on their reports and the reports of their Sub-Committees which were presented at the Session of the Section.

POSTAL TELEGRAPH-CABLE CO.

CLARENCE H. MACKAY, at whose Long Island home, Harbor Hill, one of the most brilliant receptions in honor of the Prince of Wales was given recently, sailed for Europe on September 17th on the Aquitania. He was accompanied by his daughter Ellin.

CURTIS A. COMSTOCK, vice president, is on an inspection trip of lines and offices in the fifth district of the Eastern Division.

W. C. Daviet, vice president, gave a short talk on the history of telegraph and cable service before the Men's Club of the Bergen Baptist Church, Jersey City on Tuesday evening, August 16th. Several reels of moving pictures, in connection with cable operations, were shown at the conclusion of the address.

Recent executive office visitors included P. J. Macken, superintendent, Boston, Mass.; C. A. Richardson, superintendent, Albany, N. Y.; H. D. Reynolds, superintendent, Buffalo, N. Y.; C. E. Bagley, superintendent, Philadelphia, Pa., and H. Scrivens, superintendent, Pittsburgh, Pa.

H. J. Casserly, private secretary to Edward Reynolds, vice president and general manager, has returned from a two weeks' rest at Greenwood Lake, N. Y.

J. P. O'Donohue, assistant chief engineer, attended the annual convention of the Telegraph and Telephone Section of the American Railway Association, held at Quebec, Canada.

Rufus Gould, general supervisor of plant, returned from an inspection of lines in Eastern New York.

J. J. Cardona, assistant treasurer, is spending a short vacation at Delaware Water Gap.

The new line between Fort Worth, Texas, and Los Angeles, Calif., was completed on September 15th, which was exactly one year to the day from the time the first survey was made. This line is 1500 miles in length and is one, if not the finest, line between the Mississippi River and the coast. In view of the length of the line and the type of country through which it was built, the completion within the year is regarded as exceptional.

THE WESTERN UNION TELEGRAPH CO.

George M. Yorke, vice-president in charge of engineering, is on vacation.

THE new cable connecting Hammels, L. I. with Horta, Azores, is laid and is now being tested.

G. SCHWIND, aged sixty-four years, night chief operator, 24 Walker Street, New York, died on September 21st, of heart effection. He reported for duty the day before at the usual time, but left early.

All America Cables

Direct cable service to Santo Domingo, capital and largest city of the Dominican Republic, is now available via all America Cables. The following rates will apply: Full rate (per word) 50 cents; deferred rate (per word) 25 cents; week end letters (per word) 12½ cents; (Minimum charge on week end letters $2.50).

Urgent service, to Santo Domingo City only, at three times the full rate.

Messages to points in the Dominican Republic beyond the office at Santo Domingo, will be transferred to the Dominican Government Telegraphs for delivery. A telegraph charge of 3 cents per word is added to the above rates for all points except La Romana. To La Romana the additional charge is 8 cents per word.

New Cable to Be Laid

JOHN L. MERRILL, President of All America Cables, Inc., announced on September 18th, that contracts had been signed for the new cable between New York and Cuba, to be in operation by the end of the year. With this addition, he said, the company will have three duplexed submarine cables between the two countries. The extension, he explained, will render what he termed "express service."

Mr. Merrill said that since 1920, the company had added more than 5,000 miles of cable to its system in North, Central and South America at a cost of several millions of dollars. Messages are being sent "by purely automatic means in only a few minutes of time and with a maximum of accuracy," he said.

The company issued its earnings statement for the quarter to September 30, showing an estimated three months net income after deducting operating expenses, taxes, provision for pension fund and miscellaneous items, of $652,566. Exclusive of intercompany dividends and after the dividends payable October 14, there remained a balance to surplus of $417,216.

Dividend Unchanged at 10 Per Cent

The directors of the Western Telegraph Company have declared a final dividend of 5s per share, making 10 per cent., tax-free, for the fifth year in succession.

The dividend will be paid on September 29th to holders registered September 16th.

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OBITUARY

EDWARD C. PLATT, treasurer of the Postal Telegraph-Cable Company, New York, died on September 15th. He had worked at his office as usual on Saturday, September 13th, and was found dead in bed on Monday morning.

Mr. Platt was a Southerner by birth, having been born in Mobile, Ala., on January 4th, 1851. In 1856, his parents removed to Petersburg, Va., where they remained until 1865, when they removed to Louisville, Ky. His father was an Episcopal clergyman of distinguished scholarly attainments, and during the residence of the family in Petersburg, covering the entire period of the war, he was a close personal friend of General Robert E. Lee.

Mr. Platt entered upon an active business career in Louisville, first, as a clerk in the Falls City Bank, and afterwards as salesman and chief clerk in the wholesale grocery house of Messrs. Gardner and Company, where his close attention to business and his unusual capacity for work and his accuracy in dealing with details gained him an enviable reputation. He left this employment to accept the more desirable position of managing clerk in the office of E. E. Eyre, a stock broker doing an extensive business in San Francisco. He left this employment in April, 1878, to accept a further promotion in the service of Messrs. Flood and O'Brien, and subsequently had charge of the books of the estate of William S. O'Brien. This employment led to his accepting the position of teller in the Nevada Bank, in which he performed such meritorious service as to secure for him in October, 1881, the appointment as agent of the Nevada Bank of San Francisco in New York City, which position he held for about ten years. After the death of Mr. Flood, this agency was discontinued and in December, 1881, Mr. Platt became actively engaged in the affairs of both the Postal and the Commercial Cable Companies, and also in the personal affairs of John W. Mackay. He was a member of the Building Committee, having charge of the construction of the Postal Telegraph Building, in New York City and in that capacity rendered admirable service, and naturally became one of the three attorneys having permanent charge of the building, as landlords.

As a business man, Mr. Platt was thorough, methodical, painstaking, exact, of the highest integrity and efficient to a degree, which rendered his service invaluable to those with whom he was associated.

WILLARD G. FLEMING, aged sixty-five years, operator for the Company at Kansas City, Mo., was stricken with apoplexy on September 15th and died at 10:30 P.M. the same evening. He is survived by his wife, Mrs. Carrie B. Fleming; a daughter Miss Eulah Fleming of Minneapolis, Minn. and a son Harold Fleming, Ogden, Utah.

Mr. Fleming began working for the Company in Chicago, Ill., in 1880, a few years later going to St. Louis, for the same Company. He served for a time as Telegraph Editor on the Globe Democrat, but owing to failing health, went to Colorado, where he engaged in Railroad work, filling positions of chief clerk, stenographer, yardmaster, station agent, etc.

In 1910, he returned to the Western Union fold and remained in their employ until his death. He was highly esteemed by all who knew him.

New York Telegraphers' Aid Society

THE annual entertainment and reception of the New York Telegraphers' Aid Society will be held at Terrace Garden, East 58th Street, New York, on Friday evening, November 21st.

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The Only "Short Cut" to Greater Efficiency in Sending and Receiving
The CANDLER SYSTEM
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Brings about COMPLETE CO-ORDINATION of all the faculties used in telegraphing so that SENDING AND RECEIVING is made EASY regardless of age or length of service. Builds up and strengthens that tired, overworked arm; revitalizes those jaded, strained nerves; makes you feel good and look good. Highly recommended. A great benefit to every operator says Noted Telegraph Editor. Has helped 30,000 operators—it will help you. Results are positively guaranteed. Send for FREE Booklet containing some startling facts, and full particulars of this marvelous system. Write NOW! A postcard will do.

The Candler System Co., Dept. TA, 551-A, E. 47th St., Chicago, Ill.

FORTY-FIFTH YEAR
HAVE YOU $500.00?
It takes a long time to save that amount and an emergency may come before you can do it.
A GOLD AND STOCK LIFE INSURANCE ASSOCIATION POLICY is worth $500.00 as soon as it is issued for Telegraphers and Others in Electrical and Telephone Service
INITIATION FEE, $1.00
Dues, according to age at entry.
Between 18 and 30—50 cts. per mo. Between 35 and 40—75 cts. per mo.
Between 30 and 35—60 cents per mo. Between 40 and 45—$1.00 per mo.
INSURANCE, $500.00 in payments of $50.00 per Month to Beneficiaries for Ten Consecutive Months.
F. E. FITZGIBBONS, Secretary,
195 Broadway, New York

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Telegraph and Telephone Age

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CONTENTS

PAGE

How New and Old Telegraph Apparatus and Parts are Ordered and Kept Track of. By Willis H. Jones. Elliot Head of Harvard Overseers. Telegraph and Telephone Life Insurance Association.... 463

New Cable Will Mean Rate Cut. For Last Minute Calls..... 464

The Storage Battery and Its Application to Telegraphy..... 465

University Faculty and Broadcaster Unite in First "Air College." Germans to Put Wireless Phones on Trains..... 466

A Quarter of a Century of Radio. By Lee DeForest..... 467

George Bain, Cable Electrician Retires. New Radio Stations in Greenland. Reception on Moving Vehicles. The New Anglo-Dutch Telephone Cable 469

Kleinschmidt Printers Again Demonstrated at Convention. Cheaper Cables to Antipodes. Your Friend in New York..... 471

Editorial Comment. Ownership Statement. Concession for Buenos Aires-Montevideo Cable. Voices of Men..... 472

The Railroad.—Telegraph and Telephone Section of the American Railway Association. All America Cables. Radio Corporation of America. Radio Apparatus. Obituary..... 475

Samuel F. B. Morse—His Letters and Journals..... 476

Personal. Postal Telegraph-Cable Company. Western Union Telegraph Company..... 478

Colonel Robert Ewing. First Radio World's Fair Breaks All American Trade Show Records..... 480

National Radio Conference. Declaration of Dividends..... 481

Acme Commodity and Phrase Code..... 482

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American Railway Association Standards.

THE American Railway Association is a voluntary organization of all the railroads, each of which is entitled to representation therein. Each representative is entitled to a number of votes, depending upon the mileage of railroad represented. The purpose of the organization is to further the interests of the railroads in adopting standards and avoiding useless duplication of effort.

The American Railway Association has lately included the telegraph and telephone organization of the railroads as a section of the Operating Division. This has terminated and succeeded the old voluntary organization known as the Association of Telegraph Superintendents, which was in existence since 1883. This affiliation with the American Railway Association has greatly strengthened the telegraph and telephone departments. The work of the Telegraph and Telephone section is performed by committees which are assigned subjects to study and report upon to the annual and semi-annual conventions. The section membership is composed of representatives designated by the railroads. The delegation varies with the size of the road and usually includes the superintendent of telegraph, telephone and telegraph engineer, general foreman and the other chief supervisors. Only the senior representative of each railroad is permitted to give final vote on matters being considered for adoption as recommended practice. The other members vote in the meetings and all are eligible to membership on committees. The committee appointments are made by the Committee of Direction of the Telegraph and Telephone Section.

The committees now authorized are eleven in number and some are divided into sub-committees, and the assignments include a wide variety of subjects—pole line and office construction, installation and maintenance, electrolysis, transpositions, underground construction, electric protection, development, inductive interference, traffic, education, wireless and telephone transmission. The work is proving very valuable and will result in the railroads having their own specifications for many parts of the work in a short time and eventually will make them much more independent of commercial interests in regard to standards than is now the case.

The work of these committees will be especially valuable in the future to an increasing number of railroads, due to the fact that when the existing contracts with the railroads and the telegraph companies expire the tendency will be for the railroads to take over and operate the plant, in which case the telegraph company will pay a rental for the right to place wires on the pole lines. Some railroads have already taken this action upon the expiration of their contracts with the telegraph company.

Growth of Telephone Service.—The rapid increase in the use of the telephone on the railroads both for city exchange connection and for dispatching, message and private long-distance service has greatly increased the work of the telegraph department. This is felt in the office of the superintendent, where the bills for the commercial telephone service must be handled and vouchers in payment made. A larger field force is required, particularly for the installation and maintenance of the dispatching and message telephone lines and instruments. The contracts with the telegraph company do not provide for that company to furnish any telephone instruments, but the railroads did obtain a large amount of their telephone wires free under the contracts, due to a provision that gives them a per cent. for their own use. Up to the time the telephone was adopted for train dispatching, many railroads were far below their permitted allowance. At the present time many of them have exhausted their free allowance and have had to pay for some of the telephone wires required. The actual work of repairing the telephone wires on the poles, whether paid for by the railroad or the commercial company, is generally done by the station lineman under provisions of the contract. The instrument repairs on the telephone wires are at the expense of the railroads.

Telegraph and Telephone Problems—The advent of the telephone for train dispatching and message work brought up so many and varied problems that quite a number of railroads have employed a telephone and telegraph engineer who is on the staff of the superintendent of telegraph. Other supervisory positions have also become necessary from time to time, such as chief installer and chief inspector. The railroads have done considerable work in developing their telephone standards and the problems are becoming more numerous and complicated. The old strictly telegraph organization cannot hope to handle the work without increased technical assistance.

The problem of telephone and telegraph operation and traffic is an important one, for which the superintendent of telegraph is generally responsible, and in some cases a traffic supervisor or a censor is employed to handle the details of this work. The division headquarters telegraph offices and also the large telephone switchboards are generally under the direct supervision of the telegraph department. The small way station telegraph office operators, however, are under the division superintendent and deal only indirectly with the superintendent of telegraph. Wire testing on the more important railroad divisions is performed by expert wire chiefs at the division telegraph offices. These men in many cases act as managers of these offices as well as wire chiefs. Their work is under the superintendent of telegraph and is confined to testing the trouble on railroad used wires and on the dispatching and message telephones and selectors.

Telephone Men Required—Maintenance of the telephone has brought into the service many telephone men. Some railroads assign one operating division to one man, who is thus a maintainer, but sometimes has the title of inspector. The length of the territory depends upon conditions, such as the number of stations, number of telephone circuits,

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c. Other railroads require the lineman to do the ork both on the line wires and the telephone in- ruments. Inspectors are assigned on such rail- ads to three or four linemen's territories to do the ore intricate or difficult work, such as selector re- irs that the lineman is unable to make, also to ake periodical inspections to see that the linemen e properly maintaining the instruments. These spectors usually report to the chief inspector or the telegraph and telephone engineer.

Combined Telegraph and Signal Departments—here has been a tendency in recent months to try combine the telegraph and the automatic block gnal work and have the same man do both the tele- raph-telephone line and instrument maintenance ork and the signal and interlocking maintenance ork. It can be safely asserted that the method is oomed to early failure, from the telephone-tele- raph standpoint at least. Experience in the past as shown that the combination is unsatisfactory. f a man begins his railroad experience in the signal ork he will prefer this and give it more attention nd less to the telephone-telegraph work. It is also fact that the telephone-telegraph work is becom- ng more complex and has already reached the stage where the work requires steady application and study in order to keep abreast of the development. The signal and interlocking work is likewise a life- time field for study. The past experience has been that the telephone standard has dropped, resulting in very poor service, when the branches of work are combined.

Divisional Organization—On some railroads the telephone-telegraph work is handled on each oper- ating division under the division superintendent. This division plan of organization may be satisfac- tory in some respects, but is not conducive to the best results in regard to through telegraph and tele- phone service, which is a very important thing on a large railroad, for without communication train service is at a standstill. Therefore, the depart- mental organization with its unified control and maintenance gives the maximum in service for the minimum in cost. On a large majority of the rail- roads the telegraph and telephone department is in- cluded under the operating department.—Tele- raphy and Telephony—By Stanley Rhoads.

Shorter Atlantic Voyage

In order to facilitate and secure the most ex- peditious landing conditions for passengers travelling from America to England by the Mauretania, the Cunard Company is arranging for that vessel to make a call at Plymouth on her way from New York to Cherbourg and Southampton. The call was in- augurated on the Mauretania's voyage commencing from New York on September 10th.

The arrangement should ensure passengers ar- riving in London on the fifth day after leaving New York, which will represent an appreciable saving in time to transatlantic passengers.

Old Time Telegraphers

Dear Mr. Taltavall:

I understand the Carpenters' Union have bought land near Lakeland, Florida, for old or retired car- penters on which they can build their own cottage or be housed by the unity buildings.

As per our previous correspondence on the sub- ject of a home for "Old Time Telegraphers" some time ago, I wondered if you have had any further conversation with parties that might help finance a home for telegraphers, or would there be enough interest among the telegraphers on the railroad, Western Union and Postal to maintain such a home?

To start the ball a rolling I will offer ten acres in Lee County, Florida, conditionally; which has sev- eral hundred feet river front and about 3½ miles from the Gulf, considered one of the best fishing territories, and about 8 miles from Fort Meyers over a hard road which can be covered by auto in 20 or 30 minutes, thus giving the members an out- let to a city or best fishing and hunting grounds within a half an hour ride.

The buildings should be of cement or hollow tile. Individual rooms, suites, &c., cottages for man and wife, and one large dining hall for all to eat or get their meals. No cooking allowed in building proper.

At the head of the river, which begins at this point is to be placed a pavilion of cement, large pillars, on which will be placed bronze plates from time to time the names of those that have donated or those that have enjoyed the hospitality of home. This pavilion to be placed right at the water's edge with steps leading down to water's edge for those who wish to indulge in a boat ride or go fishing and hunting.

The grounds are to be planted to various tropical trees and flowers. It will take over $100,000 to do this, and I would like to see it through as I have it all "doped" out, but there is the selfish end of it, I am no millionaire and cannot live on the climate alone, which is admitted to be the finest in the world, so I must be entitled to some compensation. Do you candidly think, or any assurance that such a sum could be raised?

Do you think the main railroads would grant passes to the Old Timers or any reduction in rail- road fare, for an institution of this kind?

Here is hoping to meet you and the fraternity at PALMWOOD-on-the-HENDRY, Fort Meyers, Florida.

Yours truly,

C. S. Rindfleisch,
Cleveland, Ohio.

Argentina's Telephones

Argentina ranks first in South America in tele- phone service. Forty-two per cent of all the tele- phone equipment in South America is located in Argentina. The service throughout the republic is being improved and extended.

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New Wireless Wonder

WONDERFUL possibilities connected with the application of wireless to everyday modern life were brought nearer to realization by a fascinating demonstration recently. By the pressing of a button in Manchester, England, powerful machinery was started at Wembley, and by the same means it was made to stop working. It is considered that the experiment may be developed so that wireless agency can be used to start, stop, and fully control individual machines, sub-stations, or big power stations at practically any distance from a convenient centre. Electric railways and light and power undertakings would thus become susceptible to automatic wireless control from a centre remote from the sub-station, where no staff would be required. Already automatic sub-stations are coming into existence with electric railway extensions, but their wireless control is a new possibility. The experiment supplies an explanation of the claim made to stop and start a motor-car by invisible methods. Many devices that will exercise a revolutionary effect upon modern life, particularly in the household, are now brought nearer to actual being. One may, for instance, look forward to the time when there will be no need to install a wiring system in houses to operate electric bells. This is an idea to which experts are at present devoting attention. Recently startling experiments in the successful wireless control of ships were reported from Rome. The Italian Navy is declared to have been carrying out tests which are infinitely more successful than any hitherto made, including the successful manoeuvring of a submarine-chaser up to a distance of ten miles. Although interference from atmospherics is the great bugbear of wireless control, in this case it was successfully overcome. To perform the feat at Wembley Exhibition the Metropolitan Vickers works at Manchester sent a wireless message to the firm's stand in the Palace of Engineering. This was passed on to a special selective relay responding solely to that particular signal. A series of automatic switches was set in motion, and this completed the starting up of an automatic sub-station. This latter was similar to those now in use for traction and lighting. The experiment was declared to be the first practical application of wireless to industrial control.

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Radio Signals Strengthened by Cold Waves

COLD waves affect radio transmission, according to recent observations taken at the Bureau of Standards in Washington, on daylight signals from the long-wave transatlantic stations at New Brunswick and Tuckerton, N. J. The signal strength was found to be quite uniform during most of the year, as was to be expected from the moderate distance of transmission, but with the coming of the cold waves of January 1924, the signals rose to more than twice their normal strength.

At the same time there were deviations of many degrees in the apparent directions of the sending stations, as indicated by the radio compass, even in the forenoon when long-wave compass bearings are generally free from errors.

The end of the series of cold waves in January did not at once restore transmission conditions to the uniformity of autumn and early winter, but left a condition of instability which persisted through the comparatively mild cold of February and early March. During this time the signals frequently fluctuated, going to high values for a few hours and then returning to normal without any obvious connection with weather conditions. After March 19th, these irregularities entirely ceased and transmission again became normal.

Observations on other long-wave stations indicate that these large variations do not occur at a distance of 50 km, that they are large at 250 to 300 km, and are again less at 400 to 700 km.

There is at present no definite explanation of this phenomenon. The cause is evidently atmospheric and the connection with the cold waves suggests that either the part of the atmosphere concerned with the signal variations lies much below the Heaviside layer (80 or 100 km) or that weather phenomena are correlated with atmospheric action at much greater heights than has been hitherto supposed.

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Facts About The Telephone

THERE is enough telephone wire in the United States to make a net that would hold the earth like an egg in an egg-cup. Besides putting one span around the equator, this net would consist of 6,584 strands joined at the South Pole and spreading gradually until they were slightly less than four miles apart at the equator.

Ten American states have, between them, more telephones than all foreign countries combined. These ten states are New York, Pennsylvania, Illinois, Massachusetts, Indiana, Ohio, Michigan, Iowa, Missouri and California.

During the last ten years the number of telephones in service in the United States has increased by 5,827,000. This increase alone is more than five times the total number of telephones now in use in the whole of Great Britain.

Chicago has one telephone for every four people.

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"Somebody Said"

SOMEBODY said that it couldn't be done,
No one knew why, they just heard it was so.
Sure, 'twas a task it were better to shun,
The oftener repeated, the worse it would grow.
No interest was shown, yet it looked a good scheme,
'Twas knocked at and kicked until it was dead;
Thus all the good was lost, as in a dream,
All on account of what "somebody said."

Somebody, somewhere, had slightingly spoke
Of something that somebody tried hard to do.
The story enlarged till, at last, quite a joke
Told in deep confidence—just to a few.
Yet 'twas repeated, confidentially, of course,
Soon it was known by the man in the street.
A little mistake, grown to look so much worse
All through the folly of those who repeat.

Think of the worry, the trouble and pain
Caused by the things that somebody says.
Nothing at all have people to gain
Broadcasting scandal all through their days.
Let us forget the slights we have heard,
Throw into oblivion the weak stuff we've read;
Discarded altogether the things that are slurred,
How much does it matter what "somebody said"?

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How New and Old Telegraph Apparatus and Parts are Ordered and Kept Track of

By Willis H. Jones

WHEN one considers the fact that thousands of new and old apparatus and renewal parts are daily being shipped from headquarters here in New York to hundreds of scattered cities, towns, and stations in this as well as foreign countries where the Western Union Telegraph Company has offices and their own instruments are used, many not familiar with the problem no doubt wonder how in the world it is possible to keep track of them thereafter.

The natural presumption of the majority of operators is that because all instruments are bound to wear out in time they are simply thrown away and new ones ordered, thus making it difficult for headquarters to know exactly how many still workable instruments of each type any given offices possesses and is entitled to.

But such is not the case. In a sense telegraph apparatus in complete form no longer actually wear out. They are rebuilt as long as there remains sufficient material on which to build, or they are superseded by a new or improved design which headquarters prefer to install. But no old instrument is either absolutely lost or wrongly credited to any office accepting the new design. The old one must be returned to headquarters just as it is where it is remolded, if possible, or such parts thereof as can be used placed in stock for repair work. Such parts as are entirely unfit for repair work or cannot be used for other purposes are then finally discarded as scrap. Not till then is the original complete instrument dead, but it is still accounted for.

Another thing that puzzles the uninitiated is the manner in which one in charge of an office is able to order any desired one of the sometimes hundreds of numbered parts a complete unit, say a Multiplex printer—is constructed with and so describe it as to insure shipment of the actual part wanted, and no other. While this may at first suggest a difficult problem, the solution is really simple. Accuracy in ordering is attained by making it compulsory on the part of one making out a list of articles wanted to follow strictly the *exact wording* of each numbered unit and part as it is described in the official catalogue with which all offices are supplied.

The importance of following copy literally may be realized better when it is stated that failure to do so constitutes the very reliable means adopted for detecting and challenging errors on part of others who sometimes mix the numbers and descriptions by a wrong combination, before shipments are made. Detection of such errors is made at headquarters. If they are not discovered by those who inspect the list of orders first, it is sure to be noticed later when it reaches the desk of the employee whose duty it is to enter each item ordered on its properly numbered and descriptive card. Hence where the number or description on the requisition differs from that on his card, he immediately challenges that item and sends it back for correction before shipment is made. Otherwise an error would not be discovered until the part had reached its destination, when a second order would be required and much time lost.

Furthermore as each numbered card or bunch of like cards shows the date, number of the requisition, and the destination of the item shipped, the totals at the bottom of each column of entries furnishes not only ready and reliable information for headquarters as to the actual number and disposition of that particular unit or part sent out up to date but also provides a means of tracing such apparatus in case some office challenges the order or denies receipt thereof. In this and other equally efficient ways the company's interests in all directions are well safeguarded.

In conclusion, I wish to say that the real object sought in writing this article is not to unduly magnify the degree of efficiency attained in the particular illustration given by implying a holier than thou attitude on part of its originator—for all successful business concerns safeguard their respective interests in some equally wise manner—but to emphasize and bring out the point that in this world of sorrow and troubles to succeed one must from first to last say *exactly what one means and* nothing else.

Elliott Head of Harvard Overseers Elected by Board at First Meeting of Year

AT ITS first meeting of the year the board of overseers of Harvard University elected as president of the board Howard Elliott, '81, of New York city to succeed George Wigglesworth, '74, of Milton, whose six-year term as overseer expired last June.

Mr. Elliott, who received his degree of civil engineer from Harvard in 1881, was reelected to the board of overseers last June, having already served two full terms, from 1909 to 1915 and from 1916 to 1922. He is a life member of the board of trustees of the Massachusetts Institute of Technology, and in 1917 served as president of the Harvard Alumni. In 1916 he received the honorary degree of doctor of laws from Middlebury College, Vermont.

Mr. Elliott is now chairman of the Northern Pacific Railway Company, director in the Western Union Telegraph Company and National Security Company, and member of the executive committees of numerous other public service corporations.

Telegraph and Telephone Life Insurance Association

ASSESSMENT Nos. 838, 839, 840 and 841 have been levied by the Telegraph and Telephone Life Insurance Association, New York, to meet the claims arising from the deaths of Andrew J. Lombard, aged eighty-one years, Washington, D. C.; Charles E. Dennis, M. D., aged seventy-one, Baltimore, Md.; and Alfred M. Schoyer, aged sixty-five, Wilkinsburg, Pa.

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New Cable Will Mean Rate Cut

WHEN the new 1,700 letter cable of the Western Union Telegraph Company is thrown open to commercial business, linking America direct with Italy and Spain and reaching Germany and the hinterlands of the Balkans, it will mean a reduction in the cable costs to Europe.

The intimation of a reduction, made recently by Newcomb Carlton, president of the Western Union Telegraph Company, was confirmed at Mr. Carlton's office by Lewis E. McKisick, assistant to the president.

"It stands to reason," said Mr. McKisick, "that when we have a fast cable such as this, carrying 1,700 letters, or more than 200 words, a minute, we must have business to fill it and that means—well, you have concluded what that means."

Western Union officials are plainly elated at the successful result or the final tests on the cable line to Italy, the first section of which, from Hammels Point, Rockaway Beach, to the Azores, is a distance of 2,360 miles. Not only did Mr. Carlton stake his job on a $4,000,000 expenditure, the result of which was in doubt until the expenditure had actually been made and the tests completed, but he has effected the first development in cable lines in fifty years.

When officials of the company complimented him and told newspaper men that his foresight had made the development possible, he said modestly: "But we couldn't lay any other type of cable with the engineering pronouncement before us."

Mr. McKisick, with Mr. Carlton out of the sound of his voice, said that when Mr. Carlton came to the Western Union in 1911, one of the first things he did was to summon the engineers.

"You've perfected new apparatus for the transmission of messages, but the cable lines are where they were when they were laid fifty years ago," he said in effect.

The result is the new cable. It will transmit 1,700 letters or more than 200 words a minute, as against 400 letters, or 50 words a minute, for the next fastest cable line, and 250 letters or 31 words for the ordinary "garden variety" of cable. The difference lies largely in what the engineers Mr. Carlton set to work found out.

The great speed of the new cable is largely attributable to permalloy, the new nickel-iron alloy, but there are other factors of importance. One is the newly invented terminal apparatus which receives incoming signals and modifies them and makes them more legible. Another is the freedom from local electrical disturbances. The disturbances from neighboring electric power systems and from atmospheric conditions have been ridded in the new cable, partly by placing a ground connection about 100 miles off New York.

The test of the line was made at Hammels Point recently, when the manufacturers turned it over to the Western Union.

"Western Electric engineers immediately connected it to the new high speed terminal equipment which they had designed and built," said Mr. Carlton.

"A group of our cable operators at Rockaway Beach could hardly believe their eyes as they watched the speed being raised from 250 letters per minute, the ordinary cable rate, to 800 and then to 1,500. At this speed the signals passed an extraordinarily severe test; they were sufficiently sharp and clear for printing telegraph operation. This speed is by no means the limit, for after a few adjustments on the receiving apparatus, the speed was raised to 1,700 letters with entirely legible signals.

"This is not laying an ordinary cable. The real reason it is of great interest is the fact that an investment of $4,000,000 was made on what amounts to an engineering theorem. We didn't know whether the new type of cable would work until we actually put it in the water. We had the engineers' calculations and laboratory tests. But this is a thing that has to be built complete before you know whether it will work."

The new cable will not be opened for business immediately, as the Italian Cable Company has not completed its link to Italy by Spain. The next section is from the Azores to Malaga, Spain, a distance of 1,347 nautical miles and the third section is from Malaga to Anzio, a short distance from Rome. The third link is 996 miles. The links from the Azores will be installed and operated by La Campagnia Italiana del Cavi Telegrafici Scottomarini. The total stretch of the cable will be 4,704 nautical or 5,422 land miles. The Italian section will be laid in the old type of cable. The cable to Spain will be working in two or three weeks; the extension to Italy will be opened about the middle of November.

The Western Union Telegraph Company plans to lay an extension from the Azores to Emden, Germany, in the spring of 1925. This cable will serve parts of Russia, all of Germany and the Balkans and Hungary.

There is no thought of replacing the present cables with the new type, it is said. The expenditure is prohibitive.

The disposition of Western Union officials is to give Mr. Carlton full credit for the improvement, as he took full responsibility for its failure and a possible $4,000,000 loss.

"If it had failed," he admitted, "the Western Union might be looking for another president today."

For Last-Minute Calls

So many people desire to make farewell calls before boarding an outgoing train that telephones have been installed on the track platforms of the Union Station in Denver. With the newly installed telephones a call may be made while the caller keeps one eye on his train. Hitherto a person had to go to the booths in the main lobby of the terminal and many had missed their trains in order to make these last-minute calls

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The Storage Battery and its Application to Telegraphy

If anyone had made the assertion a few years ago at the day would come when a current of electricity r the local sounders in the larger branch offices ould be supplied by the main office without cost, would have been considered as foolish as the dis- ple of perpetual motion. Nevertheless the day did me, and each succeeding day has witnessed the actical evidence of its possibility. The only quali- ation the author wishes to make in this statement to insert the word "additional," in reference to the penditure of energy at the main office. The cur- nt is actually supplied to the branch offices with- t calling upon the generator at the main office for iota of additional current.

We can go a little further and truthfully say that hile the branch office receives in full 100 per cent. the necessary current without additional cost, the enerator further saves the money previously ex- ended for battery room, material and attendant.

This great boon to the telegraph company is due the introduction of the storage battery in the local stem at branch offices.

W. E. Athearn is the pioneer of the storage battery stem in its practical and successful application to legraph work, and his arrangement and installa- ons of the system for the local circuits in New ork city alone are saving the company a large sum f money annually. The reader must not misunder- and the author and infer that the storage battery self receives and yields its energy in a generous anner. As a matter of fact, a cell of storage bat- ery is very exacting. It will return just what it eceives and no more. Hence, before it will deliver current to the sounders in the branch office, the ell must first receive a charge of energy from an- ther source, then it will be ready to pay out accord- g to its ability.

WHAT A STORAGE BATTERY IS.

Every moving object will, before it stops, yield in ne form or another an amount of energy equal to ie force which set it in motion. If a receptacle an be found which will receive, retain, and finally eliver all or part of the electrical energy derived rom another source, the same will become an accu- ulator, or storage cell; the difference between a rimary and a storage battery is that the former de- ives its electrical energy from the chemical action hich takes place between the zinc and copper lates, and the resultant current ceases to flow the oment the action ceases, while the storage cell imply catches the moving current from another ource and stores its energy on the surface of two ead plates within the jar, the separation of which s the feature of the battery. No better description f the preparation of these plates can be given than o quote Prof. Sylvanus Thompson: "Gaston Planté n 1860, devised a secondary cell consisting of two ieces of sheet lead rolled up (without actual con- act) as electrodes, dipping into diluted sulphuric cid, the lead becoming with repeated charges in lternate directions coated with a semi-porous film of brown dioxide of lead on the anode plate, and on the cathode plate assuming a spongy metallic state presenting a large amount of surface and holding the gases well. When such a battery, or accumulator of currents, is charged by connecting it with a dynamo electric machine or other powerful generator of currents, the anode plate becomes peroxidized, while the cathode plate is deoxidized by the hydrogen that is liberated. The plates may remain for many days in this condition, and will furnish current until the two lead surfaces are reduced to a chemically inactive state."

FAURE'S IMPROVED CELL.

Faure, in 1881, improved the Planté accumulator by giving the two lead plates a preliminary coating of red lead (or minium). When a current is passed through the cell to charge it, the red lead is peroxidized at the anode, and reduced—first to a condition of lower oxide, then to a spongy metallic state— at the cathode, and thus a greater thickness of the working substance is provided and takes far less time to "form" than in Planté's cells since the discoveries of Planté and Faure, other improvements have been made in the formation and construction of the plates, until to-day the chloride accumulator represents the highest attainments.

UTILIZING WASTE CURRENTS.

A few years ago it occurred to Mr. Athearn that the great quantity of electricity which was being constantly dumped into the ground after the various currents had traversed the coils of the sounders, etc., might still be made available for additional work. The storage cell suggested the idea of catching the current between the last sounders in circuit, and the point of its final plunge into the earth. He inserted a storage cell between those points to receive the current, as a bucket would receive flowing water if placed in the stream. The cell will in a like manner fill at a rate proportional to the density of the current flowing, the voltage of the supply being of the proper value.

When the necessary quantity of current, and rate at which all of the sounders in a branch office will draw upon the storage cell has been ascertained, it will only be necessary to turn the separate currents flowing through a sufficient number of duplex loop conductors into one channel, and place the storage cell in the common path. Thus, if the total number of sounders to be fed demands a constant flow of one ampere of current per hour, a current of one-quarter of an ampere, flowing through each of five separate duplex loops, combined and directed through the storage cell, will meet the requirements of the branch office.—*Jones' Diagrams.*

Blessed be the man who thinks and talks with facts! He is needed in the world today, where more time is being wasted and more money spent by doing things wrong than by not doing them at all. To the man with facts life offers greater resources, greater responsibilities and more satisfying achievements than at any period in history.—Electrical World.

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University Faculty and Broadcaster Unite in First "Air College"

INNOVATION IN EDUCATION CLAIMED FOR CO-OPERATIVE MOVEMENT BETWEEN NEW YORK UNIVERSITY AND WJZ.

COMPLETE endorsement of the practical value of radio broadcasting as an aid to education was demonstrated in the cooperative action between New York University and the Radio Corporation of America in opening the Fall Term of the recently instituted "Air College" at station WJZ on October 6th. Addresses by members of the New York University Faculty and General J. G. Harbord, President of the Radio Corporation broadcast direct from the college playhouse on that date officially inaugurated an extensive schedule of educational broadcasting having no parallel in broadcasting history.

The fall term of the "Air College" will consist of fifty-four twenty minute lectures covering eight subjects, to be broadcast from WJZ every weekday evening from October 7th to December 23rd.

The "Air College" has as its primary object the dissemination of educational information of the non-technical or popular type. It will present through the medium of radio broadcasting attractive lectures on subjects of general interest. New York University recognizes the growing power of radio as a stimulant of public interest in the arts and sciences, and has established a Radio Educational Committee headed by Professor Marshall S. Brown, Dean of the Faculties. Assisting him in this work are Professor James E. Lough, Dean of the Extramural Division, and Professor H. C. Hathaway, Director of Public Occasions.

After more than a year of exhaustive investigation by both university and WJZ officials as to the possibilities of this new field, the eight courses comprising the fall term were determined upon. Although the work will be in line with that presented in the classrooms it will be simplified to such a degree as to be understandable to the most casual "Listener-in".

The "Radio Faculty", as the professorial board of the "Air College" is known, is composed of leading figures in the educational world, including Professor Ralph V. D. Magoffin, President of the Archaeological Institute of America and Professor of Classics at New York University, E. George Payne, Professor of Educational Sociology, Reid L. McClung, Professor of Economics, Edward C. Smith, Professor of Political Science, J. Edmund Woodman, Professor of Geology, Charles E. Bristol, Professor of Biology and Mrs. Clara E. Breakey, Lecturer on Home Economics.

Each of the courses were especially selected and prepared with the realization that the mind of the radio audience is composite in the extreme. Fullest results can be obtained only by considering the varied reactions of that audience to unattractive presentation of even the most valuable material. Human interest and non-academic treatment, two prime requisites of successful radio addresses, have been stressed in the choice of subjects and professors for the radio lectures. The curriculum for the first term takes up eight subjects in turn, each to be covered completely before going on to the next. The schedule follows:

October 7-10th, "Facts, Figures, and Fancies of Archaeology" by Professor Ralph V. D. Magoffin.

October 13-17th, "Politics and Statesmanship" by Prof. E. C. Smith.

October 20-24th, "Cooperative Economics" by Mrs. Clara E. Breakey.

October 27th-Nov. 7th, "Economics" by Prof. Reid L. McClung.

November 10-26th, "Geology" By Prof. J. Edmund Woodman.

December 1-5th, "Biology" by Prof. Charles E. Bristol.

December 8-12th, "English."

December 15-23rd, "History and Development of Civilization" by Prof. E. George Payne.

Germans to Put Wireless Phones on Trains; First Is Tested on Berlin-Hamburg Express

After two years of experiments the German postal authorities on September 27th started a wireless telephone service on the express train between Berlin and Hamburg which if successful—and experience proved very promising—will be extended immediately to express trains from Berlin to Frankfort, Danzig, Stettin, Hanover, Dresden and from Hamburg to Stettin.

On September 27th a number of telephone conversations took place between passengers of the Hamburg express train and persons at Berlin and other German cities and proved successful in every case. The apparatus on the train projects electric waves that have only a few meters to travel, being immediately caught by wires of the telegraph and telephone system which run alongside every German railway. Morse signs sent out by the train were thus transmitted to the central telephone station Spandau, whence men at the other end were called and put in connection with those who desired to speak with them on the train. But instead of Spandau any other place might have been used as a relay station if it had been prepared.

The train on which experiments took place traveled at a speed of forty-five miles an hour. Only a few minutes were required to get the connection with Berlin. Conversations were very distinct, the absence of any noise by the train being especially noted. The price charged for a conversation from the train does not exceed that for an ordinary urgent telephone conversation of equal length.

A small compartment in one of the cars served as a telephone office. One booth was reserved for passengers calling Berlin, while another booth served passengers called up from Berlin who talked with them with equally satisfactory results.

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A QUARTER CENTURY OF RADIO

rom Signaling by Hertzian Waves to the Long-distance Entertainments of To-day—Many Early Devices, Once Abandoned, are Being Rediscovered and Put to Use

By Lee DeForest
President, DeForest Phonofilm Corporation,
New York.

The progress in radio of recent years has been astonishingly rapid and has developed so completely away from the lines which were first laid own in the initial days of wireless that a brief sumé of those early days is not so easy as it might ppear. Few who are at work in the art today are emselves familiar with the primitive apparatus in gue twenty-five years ago. One must go to the useum shelves to find any of the apparatus which as considered essentially modern and as marking rogress in the then infant art.

Our mastery of the science of radio has advanced rapidly that in looking back it is difficult to realize e meager state of information and collected data pon which pioneers were compelled to build their rogress. Although the first demonstration of the racticability of signaling by Hertzian waves occurred in Europe from 1896 to 1900, it did not take ie American investigators long after they had set iemselves to the task to appreciate the essential iortcomings of the European appartus and to et completely away from the primitive coherer, tapper and Morse inker, which has been considered indispensable abroad; to substitute for the Ruhmorff spark coil alternating-current transformers nd begin the development of wireless along more ruly engineering lines. It is true that the conception of the upright aërial and the earth connection nticipates any practical work done in America, but he theory of the two-tuned circuits at transmitter nd receiver, the importance of diminishng as far as ossible damping in the oscillating circuits, the heory of closely and loosely coupled circuits, etc., vas first worked out in this country, notably by ohn Stone Stone.

It is only fair to point out that in this period (from 1899 to 1905) very much of the fundamental heory and many conceptions which have piloted adio engineers up to present-day development were aid down. However, the implements for taking advantage of the procedure called for by theory were ot at hand. Thus it was not until the discovery of the quench-spark principle by Professor Wein hat means were afforded for radiating a slowly damped train from the aërial. In this development Germany was unquestionably the world's leader, just as a Dane, Poulsen, through his important discovery of the arc in hydrogen supplied the means for securing relatively undamped wave radiation. The commercial development attendant on these two important discoveries found its most rapid advance in America. This was particularly true as regards the arc transmitter. Owing chiefly to the foresight and indefatigable energy of C. F .Elwell and the engineers of the Federal Telegraph Company of San Francisco, abundantly encouraged by the generous cooperation of the United States Navy, the high-powered arc transmitters were brought to a basis of operative practicability very far ahead of anything which was done in Europe.

In reviewing the rapid evolution of the wireless art it seems now astonishing that we can already look back at the development of this all-important improvement, the Poulsen arc, as something far remote in history. Ten years ago, at the beginning of the war, this development of the arc transmitter, coupled with Fessenden's heterodyne receiver, made practical by the oscillating audion detector, seemed to be the last word in the refinement of high-powered radio communication. Yet this date, 1914, may well be taken as the line of demarcation between the old and the new radio. The use of the arc, it is true, has continually increased up to the present time, supplemented and in many cases supplanted by the various types of high-frequency alternator, notably that of Alexanderson. But the ever-increasing use of the oscillating three-electrode vacuum tube in every branch of every radio system, the refinement in its manufacture and the discovery of methods for constructing this device to sizes capable of handling 100 kw. or more—all this has wrought a genuine revolution in the radio art, compared with which its rapid progress prior to 1914 was more like a gradual evolution.

WIRELESS BEFORE THE WAR

In dealing, therefore, with the early days of wireless I shall confine my attention to work prior to the beginning of the world war. Many of us well remember the eagerness—the incredulity on the part of some—with which we read the newspaper accounts of wireless messages having been flashed across the British Channel. Personally I can recall the very real difficulties encountered in sending my first wireless signals across the Hudson River in 1901, and later between 17 State Street, New York, and Staten Island a distance of 7 miles. It is almost impossible to understand now why just such difficulties were encountered by us pioneers through the veiling light of the vast amount of experience and knowledge which has been accumulating through the twenty-odd years intervening. But the fact remains, those difficulties were at that time very present, very actual and discouraging. Such early workers as Pickard, Schoomaker, Fessenden and myself had started out with the idea that success in wireless telegraphy would necessitate self-restoring detectors with telephone receivers (instead of Morse inkers or sounders), and alternating-current transmitters, giving spark frequencies sufficiently high to permit telegraphing at Western Union speeds—something undreamed of at that time by our European rivals. Consequently we saw at the period of the international yacht races of 1903 a

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speed of word transmission of twenty-five per minute. We also experienced a deplorable amount of interference from static disturbance and willful obstruction, which showed us vividly how unprotected and liable to disturbances and interruptions was the wireless communication of that date. Lessons learned during that event resulted in an intensive study of the problem of interference and methods for overcoming it, in working out which we found the greatest amount of theoretical guidance and suggestion from the writings and teachings of John Stone Stone.

Early in the spring of 1904 wireless messages were first transmitted 180 miles over land, between Buffalo and Cleveland. During the ensuing summer at the St. Louis Exposition this distance was increased to 300 miles—between that city and Chicago, where a commercial wireless telegraph service was then first established and more or less successfully maintained. This demonstration at the St. Louis Exposition was made the subject of an elaborate test and report on the part of its electrical committee of awards, of which Dr. C. P. Steinmetz was a member and William J. Hammer chairman. I well remember the astonishing precautions which this committee took in its efforts to make certain that there was no hocus-pocus in the claim that wireless messages were actually transmitted from the fair grounds to a receiving station in Chicago. This skepticism was doubtless justified, considering the fact that this overland transmission had never before been attempted; but to the radio fan of today who nightly listens in to telephone stations one thousand to three thousand miles away this attitude of mind on the part of learned electrical engineers just twenty years ago this summer must seem astonishing.

RADIO AUDIENCES UNKNOWN IN 1904

In those days, before the advent of the oscillating three-electrode generator and even before the crude arc-telephone transmitter, there was no radio audience outside of governmental and a few scattering commercial wireless stations. Consequently interest in the art was limited entirely to the few who were directly concerned with its development for commercial or military purposes. The literature was chiefly limited to the one or two foreign periodicals, and in this country to a very occasional paper before the Institute of Electrical Engineers or in one of the electrical journals. Certain promoters, misled by the seeming miracles which were being accomplished by transmitting messages over considerable distances without wires, took advantage of the awakening public enthusiasm and, basing their predictions on the successes suddenly attained, without waiting for the test of time to determine how reliable this new service might be, expected a mushroom growth of wireless telegraph stations all over the country. As a result of these misconceptions and ill-directed developments millions of dollars' worth of stock was marketed in various wireless-telegraph companies. Most of the money thus taken in was dissipated or wasted, with the inevitable result of a serious setback in the development of the new art, one which proved disastrous to all concerned. Yet, although many of the predictions of that time as to the coming universality of wireless-telegraph communication everywhere at only nominal toll rates proved wrong, another vision and prophecy as to the coming application of widespread radio-telephonic distribution of entertainment and information valuable to the mandates from that period and has already abundantly proved its correctness. Long after I had published such a prediction in 1907 the broadcasting of opera music was actually realized from the stage of the Metropolitan Opera House in New York. A night when Caruso was singing was selected for this first radio effort. Ships in the harbor or just sailing were advised of the event and made up a large part of the radio audience, which was, of course, at that time very small. The attempt was ten years in advance of the times. In 1906, prior to the advent of the audion, several lines of development had been laid down to be subsequently abandoned as either impracticable or far in advance of their need, only to be taken up again quite recently and found to offer an important solution to problems which have baffled experimenters and radio engineers for the past twenty years. Notably among these I may mention the use of the short wave combined with parabolic reflectors to give relatively straight-line transmission. This arrangement, which begins to approach economy of transmission and enormously reduces the probability of interference, was outlined and patented in a form particularly applicable to use at sea as early as 1906. Recent work by the Westinghouse company in this country and the Marconi company in England has demonstrated the extreme utility of the short-wave transmitter device, which in its crude form was cast aside in 1903-19 in favor of the use of ever-increasing wave lengths.

I venture to say that we do not even now begin to appreciate generally the immense utility of the short wave length; that ere long radio engineers will hark back to the first pioneering work of Hertz and will appropriate to the use of ship-signaling in fog, and to other vitally important uses, the extremely short wave lengths which were originally investigated by that master.

Another less spectacular instance of very modern applications of a principle originally old and almost forgotten is that of the "rejector" circuits, wave filters, etc., all of which were fundamentally investigated and their laws carefully laid down by John Stone Stone in his papers and patents on these subjects, documents which should be truly considered classics in the art.

RADIO REPLETE WITH REDISCOVERIES

The history of radio development is replete with such instances where some pioneer, working long ahead of his time or of the public needs, has discovered some principle or invented some device which later on, when the need for it arises, is again rediscovered or reinvented—too often, alas! with

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complete failure to recognize the historical verities involved. As further example of this tendency I might cite the use of the two-grid audion, which dates from 1908 in the United States and was brought to great technical refinement in Germany in 1919, but only within the last few months "rediscovered" in England with a great fanfare of publicity. Many similar instances will suggest themselves to radio engineers and students of the art whose experience or reading goes back to early days when pioneers, possessing far vision and little deterred by the actual practical limitations of their art and its public patronage, mapped out lines of development or conceived inventions, the benefits of which were to be reaped not by themselves but by those who should come after.

George Bain, Cable Electrician, Retires

"GEORGE BAIN, cable electrician for the French Cable at New York was retired on a pension October 1st.

Mr. Bain, in common with very many of the older or primitive members of the cable service, commenced his telegraphic career with the British Post Office Telegraphs, later joining the Direct United States Cable Company from which he transferred to the French Cable Company service a quarter of a century ago and has remained with them ever since. In his cable service of over forty-three years Mr. Bain has seen many changes and improvements in cable working since the days when the Mirror, or "flash-light" instrument, was used across the Atlantic cables.He is one of the few remaining long-cable-Mirror operators and has kept pace with all the modern improvements in cable operating.

His colleagues presented him with a valuable gold watch as a token of their esteem and goodwill."

New Radio Stations in Greenland

THE Danish Government has sanctioned a credit for the erection of four new radio stations in Greenland. The stations will be at Julienbaab, Angmagsalik, Godthaab, and Godharn, respectively. The largest will be the first named, using the Poulsen system, with 5-kW power. The second station will operate on the spark system, and the last two will use valves. The question has been debated whether the young Danish industry is competent to supply the plant, but the contracts have been finally placed with the Dansk Radio Aktieselskab, a company comprising a number of Danish firms. The outlay involved is estimated at 900,000 Danish crowns.

Reception on Moving Vehicles

AN experiment in broadcast receiving is to be made by the National Omnibus & Transport Company, Ltd., which started a monthly service for theatre visitors from Colchester to London on October 2nd. The omnibus was fitted with a special set, including a loudspeaker and headphones for each passenger.

The New Anglo-Dutch Telephone Cable

A PAPER-INSULATED SUBMARINE CABLE

A RAPID expansion of telephonic communication between Great Britain and the Continent has necessitated a considerable increase in the number of circuits, and it was recognized that a radical change would have to be made in the type of submarine cable hitherto used before an economic and efficient service could be established.

With the exception of the introduction of "loading" in 1910, all the cables crossing the English Channel and North Sea are practically similar in design to the 1851 cable by means of which telegraphic communication between England and France was first successfully established.

The insulating material of the existing cables consists of gutta-percha, or in the case of the loaded telephone cables laid in recent years of balata, a material having very similar insulating and physical properties to gutta-percha, but possessing the distinct advantage of a lower leakance.

Conductors insulated with these materials are relatively large in diameter, which fact limits the number of circuits that can be embodied in a cable. Existing submarine telephone cables contain only four conductors, almost the maximum number that can be used, otherwise the weight of the cable would jeopardize the chance of effecting repairs in the North Sea where the adverse weather conditions necessitate promptness of action.

The introduction of the thermionic valve has made fundamental changes in the art of telephone transmission; line losses being made good by the valve repeater, high efficiency is not so essential, but the requirements regarding interference between circuits and the uniformity of the electrical characteristics are more stringent. However, the immediate result has been that a lighter weight of conductor can be employed.

Paper-insulated and lead-covered cable possesses the great advantage of having a low electrostatic capacity combined with a low leakance, an important factor in the efficient transmission of speech; moreover, as the insulated conductors are comparatively small in diameter, a cable can be constructed containing a large number of conductors without becoming too heavy to handle and repair expeditiously. Cables of this type have already been laid in the Baltic Sea which, however, is practically tideless and free from strong currents.

The cost of such cable being considerably less than that of the gutta-percha and balata types, it was decided by the British Post Office and the Dutch Telegraph Administration to proceed with the manufacture and laying of such a cable between England and Holland. The general outlines of the construction, the transmission efficiency required, and the conditions which the cable had to comply with, were prepared by the Post Office Engineering Department, the following being the principal features:—

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Length of cable, 86 nautical miles.

Number of conductors, 16, consisting of 4 sets of quadruple cores.

Each conductor continuously loaded with iron wire.

Dry paper insulation.

Two separate lead coverings, with bituminous compound between them.

Armouring of galvanized steel wires.

Attenuation constant (B) per nautical mile at 800 cycles per second ($2\pi f=5,000$) of each circuit not to exceed 0.02.

Interference between circuits as measured on the standard cross-talk meter, using actual speech cross-talk between physical circuits, not to exceed 400 millionths (equivalent to 75 miles of standard cable or a Bl of 7.8).

Overhearing between a physical circuit and its associated phantom circuit not to exceed 4,000 millionths (equivalent to 52 miles of standard cable of a Bl of 5.5).

The details of design and methods of manufacture were left to the contractors, who recognized that the requirements could only be attained by instituting an entirely new departure in the mode of manufacture. Large workshops had to be erected and new machines installed before the manufacture could be undertaken. The raw material necessary for making the cable had to be specially prepared; for instance, the copper wire and strip forming the conductor had to be drawn to within very narrow limits of size; the iron wire used for the loading had to be diamond drawn by improved methods and subjected to a special form of heat treatment to ensure the uniformity of its permeability. Even after all the material had been analyzed and tested, only a carefully selected portion was used in the construction of the cable. In the course of manufacture new systems of "balancing" were devised, but perhaps the most striking feature was the means adopted to avoid the necessity of making numerous joints; the lead coverings, in fact, were applied in continuous unbroken lengths of about ten nautical miles, which, we are informed, is far in excess of anything previously attempted in England. When it is remembered that the eighty-six nautical miles of cable would have necessitated probably three or four hundred joints, if it had been made in the usual way, it will be realized that a great step forward has been made in cable manufacture.

On completion the 10-mile lengths were spliced together and transferred to the cable-laying vessel, the actual electrical tests obtained being as follows: Electrical constants of each physical circuit in the cable per nautical-mile loop at a temperature of 60 deg. F. and a frequency of 800 cycles per second.

Resistance—16.12 standard ohms.

Capacity—0.11 microfarad.

Inductance—19.3 millihenries.

Leakance—2.8 microhms.

Characteristic impedance (Zo)—422 ohms with phase angle 4 deg. 50 min. downwards.

The impedance is very uniform; between $2\pi f=2,000$ and $2\pi f=12,500$ the variation is less than $\times 2\frac{1}{2}$ per cent.

Attenuation (B) per nautical mile at 800 cycles per second ($2+f=5,000$) 0.0199.

In the same quad, maximum cross-talk, 200 millionths (equivalent to about 80 miles of standard cable, or a Bl of 8.5).

Maximum overhearing, 2,000 millionths (equivalent to about 60 miles of standard cable, or a Bl of 6.2).

Between quads. phantom to phantom, maximum 70 millionths (equivalent to 90 miles of standard cable or a Bl of 9.5).

In respect of the cross-talk and overhearing tests, which were regarded as the most difficult conditions to meet, the actual values are far better than the stipulated requirements; in fact; the makers consider that the cable is probably superior to any hitherto made for long-distance telephony, and justifies the very special measure taken to ensure the production of a cable capable of fulfilling the difficult conditions imposed.

The steamship "Faraday" sailed from Woolwich with the cable, which weighed 2,150 tons, for the laying operations which commenced at Domburg, Walcheren, on the Dutch coast, and were completed at Aldeburgh, Suffolk, on August 29th. The cable was laid and both ends were landed without the necessity of making a joint ("final splice") during the expedition, which is a very unusual performance and only possible in favorable weather.

The successful completion of the undertaking solves one of the principal engineering problems involved in the development of an international telephone service.

The contractors to the British Post Office for the whole work of manufacture and laying the cable were Messrs. Siemens Brothers and Company, Ltd., of Woolwich.

In addition to the technical and scientific publications listed, on another page of this issue, Telegraph and Telephone Age is prepared to fill orders for any books now in print and on the market, including fiction, and technical works on all subjects.

It frequently happens that our readers, who are pursuing courses of study of various subjects, are unable to obtain copies of desired publications from local booksellers. In all such cases, we will be glad to receive orders for the books required. Our prices for books ordered from us do not exceed the regular local retail prices. If by reason of our special arrangements with publishers, our prices can be made less than the usual retail prices, our customers will be given the benefit of such reduction.

Order by titles, giving name and address of publisher, if possible.

Orders should be accompanied by remittance of amounts equal to the local retail price or, if preferred, books will be shipped C. O. D. and our charge will be collected at destination by the carrier's agent.

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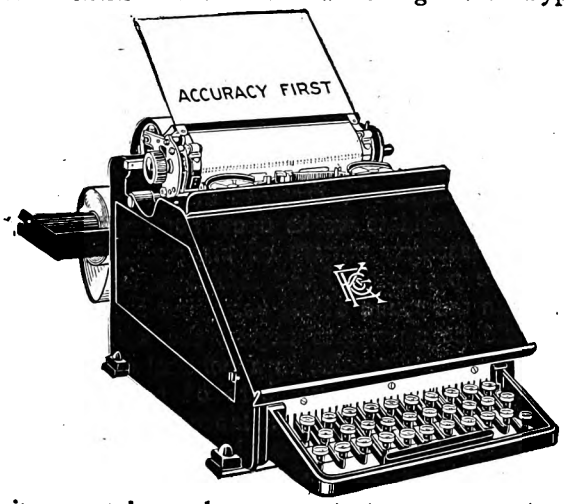
leinschmidt Printers Again Demonstrated at Convention

AN interesting feature of the Telegraph and Tele-hone Section of the American Railway Associa-on Convention held on September 9th, 10th and th at Quebec, P. Q., was a demonstration of the mplified Kleinschmidt Telegraph Typewriter man-actured by the Kleinschmidt Electric Company of ong Island City.

The first demonstration of the Telegraph Type-riter was made at the September, 1923 convention Colorado Springs. At that time a great deal of terest was shown by the telegraph superintend-nts and predictions were made that there would be large field for this unit in railway work.

Since the Colorado Springs Convention between ne hundred and fifty and two hundred Telegraph ypewriters have been installed in various parts f the country and are now giving splendid results n daily use. The most remarkable part of the quipment is its ability to give service over long eriods of time without mechanical attention. One nachine has been in operation for over eight months vith no mechanical attention whatever and it is a eneral thing for Typewriters to run for three or our months without even an oiling. The Type-



writer contains only one contact, one magnet and one motor. Outside of these electrical features, the Typewriter is entirely mechanical and is sturdily built of the best material that can be procured. This fact coupled with the simplicity of its design accounts for the splendid record it is making in the Railroad and Commercial field. The latest improvement is a device whereby any station may stop the motors on all printers along a way wire in a manner that permits any station to again start the printers at will.

Because of its low first cost and low maintenance it is effecting savings on lines where the volume of traffic is light and the savings are, of course, correspondingly larger on long, heavily loaded circuits. Railroads are now handling way bills and car consist reports as well as regular message traffic by means of these new units. One railroad claims that it is moving freight cars a day earlier than before Telegraph Typewriters were installed and another advises that if the two machines they have in service were taken away, three additional men would have to be put on in order to handle the same load. Economies in time and money are being made wherever Telegraph Typewriters are installed.

It is felt that it will not be long before railroads all over the country will be using these simple reliable Typewriters on a large scale. It appears that the Printer is at last coming into its own and great credit is due to the concerns that have made the Printer a success especially the people who pioneered the Type Bar Printer which is responsible for the reliability of the present day equipment.

Cheaper Cables to Antipodes

THE Pacific Cable Board in conjunction with the Imperial Cables, as well as the Eastern Telegraph Company, are reducing the ordinary telegraph rate from Great Britain to Australia from 3s to 2s 6d a word, as from December 1st next.

The rates to New Zealand, an official of the Post Office stated, will be reduced from 2s 8d to 2s 3d a word.

The rates for deferred traffic will be correspondingly reduced from 1s 6d to 1s 3d a word to Australia and from 1s 4d to 1s 2d a word to New Zealand.

The same rates will apply via the Western Union and Commercial Cable Company's routes in conjunction with the Pacific Cable.

Your Friend in New York

COMPARATIVELY few people can honestly claim to have a friend in New York, but every subscriber to and reader of Telegraph and Telephone Age can.

You may never have seen or heard of any particular individual among the 6,000,000 that live here, nevertheless you need not feel like a total stranger to New York. You, reader of Telegraph and Telephone Age, should feel you have a friend here who is willing, anxious and glad to do anything that an individual friend might do for you. All you need to do is to introduce yourself—by mail, if necessary; or in person by calling at our office, Room 414, Postal Telegraph Building. You are welcome at any time to ask us to give you any friendly assistance that you may need, either by obtaining and furnishing information or by making purchases for you. Our book department is already prepared to obtain and send you, any book now in print and on the market, in addition to the excellent technical books specifically listed in our columns.

We will be pleased to make purchases for you of electrical equipment, or of anything you want of any kind.

Call upon "Your Friend in New York" just as confidently as you would call upon an individual friend and don't fail to call at our office when you are in town. Have your mail sent to our care, if possible. It will be safeguarded and forwarded in whatever way you say.

Whatever you do, don't forget that Telegraph and Telephone Age is "Your Friend in New York."

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EDITORIAL COMMENT

Ownership Statement

STATEMENT of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of TELEGRAPH AND TELEPHONE AGE, published 1st and 16th days, each month, at New York, N. Y., for October 1, 1924.

State of New York,
County of New York,
ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared John B. Taltavall, who, having been duly sworn according to law, deposes and says that he is the publisher of THE TELEGRAPH AND TELEPHONE AGE, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit.

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, John B. Taltavall, 253 Broadway, New York.

Editor, John B. Taltavall, 253 Broadway, New York.

Managing Editor, none.

Business Managers, none.

2. That the owner is:

John B. Taltavall, 253 Broadway, New York.

3. That the known bondholders mortgagees and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities, are:

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

JOHN B. TALTAVALL, Publisher.

Sworn to and subscribed before me this 17th day of September, 1924.

[SEAL] JOSEPH R. FRITH.

(My commission expires March 30, 1926).
Notary Public, Kings County, No. 151.
Certificate filed in New York County, No. 360.
Kings County Register's No. 6164.
New York County Register's No. 6283.

Voices and Men

WHICH has the most effect upon the mind of the voter—the speech of a political candidate heard at a public meeting, or his speech heard in the home on the wireless? This is a question now being very seriously considered in America, in view of the efforts to develop wireless for the purposes of political propaganda. It is held by some political experts that the presence of the candidate has a more powerful influence than the sound of his voice. Wireless makes clear his views, but it does not reveal his personality, his appearance, his winning ways. These are indeed great aids to election, and sometimes as important as opinions. Nor does the wireless convey that election excitement which can only be enjoyed at meetings. The political speech may come by wireless through the atmosphere into the home, but it is argued that it can never bring the real atmosphere of a crowded meeting at which an eloquent candidate works upon the feelings as well as the reasoning powers of his audience. In the main the presence of the candidate is more effective than the sound of his voice, but because of this it would be unwise to neglect the wireless, which has a very subtle value in a political campaign. By the use of it large numbers of people living at distances which make attendance at meetings difficult, if not impossible, may hear and be converted —or infuriated, as the case may be. Many listeners-in in the home freed from the excitement of public meetings, can listen more carefully and appraise more critically the value of political speeches. Candidates will have to consider these voters when their speeches are broadcast, for the wireless is going to have some influence on the electorate.

Concession for Buenos Aires-Montevideo Cable

THE President of Argentine has approved an application from the Italian Submarine Cable Company for a 50-year concession involving permission to lay a cable between Buenos Aires and Montevideo. The installation and operation of this cable will be subject to the national law regarding telegraphs and rates and to the terms of the International Telegraphic Convention, to which the Argentine Government is a party. The decree also provides that the service of the line is to be exclusively for international traffic.

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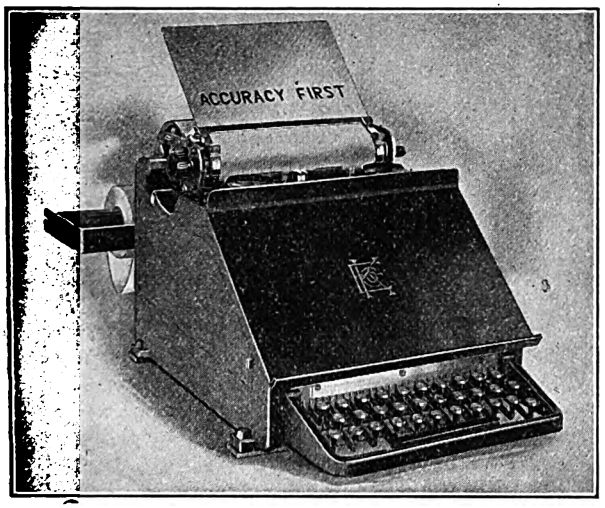
THE KLEINSCHMIDT TELEGRAPH TYPEWRITER

AN ENTIRE SYSTEM IN



ONE SIMPLE TYPEWRITER UNIT
Not Merely A New Design.
A Revolutionary Change.
The Unit that proves in on lightly loaded circuits.

Kleinschmidt Electric Co.
LONG ISLAND CITY, NEW YORK

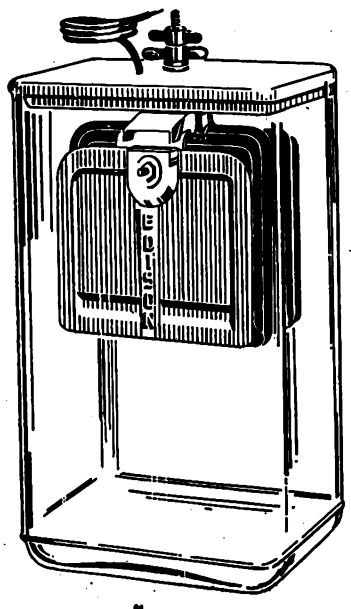
HALL SWITCH & SIGNAL CO.

Garwood, N. J. Chicago

MANUFACTURERS OF THE

GILL SELECTOR

THE UNIVERSAL SELECTOR
FOR
TELEGRAPH AND TELEPHONE



EDISON PRIMARY BATTERIES
for Telephone Service

There undoubtedly is a very good reason why such representative railroads as the Pennsylvania System, the New York Central Lines, the Lackawanna and others are using so many Edison Primary Cells on dispatcher's transmitters, and in other classes of telephone service.

We shall be glad of the opportunity to demonstrate to anyone interested why they have found them so satisfactory and economical.

Thomas A Edison, Inc.
EDISON SIGNAL BATTERIES-PRIMARY and STORAGE
BLOOMFIELD - NEW JERSEY

ST. LOUIS Railway Exchange Bldg. CHICAGO Peoples Gas Bldg. SAN FRANCISCO Balboa Bldg.

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

THE Committee of Direction will hold a meeting Chicago on October 23rd, when the work of the ar will be mapped out for the various committees id the personnel of the different committees ap-inted.

All America Cables

MANAGER E. LASSEN of Port Limon, Costa Rica, is been transferred temporarily to La Libertad, alvador.

Manager R. S. Hamilton returned to Ponce, Porto ico, after a furlough spent in the United States id Canada.

Manager C. H. Criffon of San Juan, Porto Rico, ft on a furlough in the United States.

Travelling Electrician A. B. Crossman arrived in ew York enroute for South America on his return om furlough.

Assistant Manager W. J. Park arrived in New ork for temporary duty enroute for his station in ima, Peru.

Traffic Engineer A. Cunningham assumed charge f the apparatus and equipment department in con-ection with his work in the traffic engineering epartment.

Supervisor W. A. Behegan arrived at Santiago, uba, where he will relieve Manager Marstrand or furlough.

Radio Corporation of America

E. J. NALLY, managing director of foreign re-ations, is in New York for a brief stay. Mrs. Nally nd E. J. Nally Jr., accompany him.

David Sarnoff, vice-president and general mana-ger, Dr. A. N. Goldsmith, chief broadcast engineer, P. H. Boucheron, manager, advertising department nd J. L. Bernard of the publicity department are ttending the Washington D. C. Radio Conference.

W. A. Winterbottom, traffic manager, is in Paris ttending the radio conference.

Radio Apparatus

THE Department of Commerce announces that, according to the data collected at the biennial census of manufactures, 1923, radio apparatus to the value of $43,460,676 was manufactured during the year for sale as such. This total includes 1,889,614 head sets, valued at $5,352,441; 508,001 loud speakers, valued at $5,620,961; 414,588 receiving sets of the tube type, valued at $12,065,992; and 116,497 receiving sets of the crystal type, valued at $550,201; together with the other items shown in the table below. The manufacture of 2,601,575 radio tubes, valued at $4,572,251, was reported separately. A part of these tubes were sold to manufacturers to complete receiving sets (and their value is therefore included in the total value of such sets, as given above) and the remainder were sold to individual purchasers for use in the construction of home-made sets.

OBITUARY

GEORGE W. FOSTER, aged 70 years, pioneer Texas telephone man and special agent for the Southwestern Bell Telephone Company, died on September 23rd, at a local sanitarium following an illness of many months. Mr. Foster lived at 3502 Armstrong avenue, Highland Park.

Back in the early days of American history, when American citizens were greatly needed and desired, a family of pure English settled in what is now Allegan County, Michigan. Of this family George Wheeler Foster was born on May 3, 1854, a descendant of one Rev. Thomas Foster of Ipswich, England, who flourished in the last quarter of the sixteenth century, under the regime of the good Queen Bess.

George Wheeler Foster was born at Otsego, Allegan County, Michigan, May 3, 1854, and became a telegraph operator at Kalamazoo in 1869. In 1880 he married Miss Fannie J. Segur at Toledo, Ohio, who survives him. In November of the same year he became train dispatcher for the International-Great Northern Railway Company at Palestine, Texas. This was in the days when Capt. Hayes and Col. H. M. Hoxie had charge of the road. It was during this time also that the late Tom Kingsley, a friend of Mr. Wheeler's was conductor of a work train which was engaged in building the line from Austin to San Antonio.

In 1882 Mr. Foster entered the service of the Southwestern Telegraph and Telephone Company as manager at Houston, "when the old Alcalde was Governor of Texas and Uncle Dan'l McGary, Hamp Cook, Dr. S. O. Young, Dudley Bryan and Walter Wilson, as newspaper hustlers, were watching out that the Governor did it right." They were correspondents at the State capital. Mr. Foster also recalls as friends of his Mayor W. R. Baker and such newspaper men as T. J. Girardeau, J. W. Johnson and others of the old guard.

He became manager of the Galveston branch of the Southwestern Telegraph and Telephone Company and then manager of both Houston and Galveston in 1883, and was made district superintendent in 1887. In May, 1890, he was made division superintendent at Dallas. In 1895 he held his first governmental appointment, that of Major and Assistant Paymaster General by Governor Culberson.

It was in July the following year, 1896, that Mr. Foster was again in the communication service, having been appointed general superintendent of the Postal Telegraph Cable Company of Texas. The lines of the Company were then under construction in Arkansas, Texas and Louisiana. When this work had been completed he became special agent, afterward assistant to the general manager of the Southwestern Telegraph and Telephone Company. After a lapse of a few years he was again special agent for this company in 1915. He held this position up until the time of his death.

"One thing of importance of which I am particularly proud," he said recently, "is that I edited the Southwestern Telephone News from its inception in 1906 until 1915."

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Mr. Foster first became seriously ill in December, 1923. At that time he underwent an operation, which failed to relieve his weakening condition.

Mr. Foster is survived by his wife, who before her marriage to Mr. Foster in 1880 was Miss Fannie Segur.

THE Telegraph Department of the Erie Railroad suffered a great loss in the death of George R. Hill, late wire chief at "Hu," Jersey City.

Mr. Hill was born at Howells in 1878 and came to "Ya" as a messenger at the age of fourteen years. He rapidly mastered the telegraph key and went to White Bridge Tower, on the New York Division, in 1904. Misfortune soon overtook him there when he was struck by a pusher and suffered the loss of a leg.

Returning to duty in a few months, he made light of his handicap and developed into a first class telegrapher. About 1902 he was moved to "Hu" and, under the tutelage of T. F. Mitchell, then wire chief, he made fast progress in wire testing.

At the death of Wire Chief Mitchell in 1905, Mr. Hill succeeded him and held that position until the weakening effects of tuberculosis compelled him to lay off some ten months ago.

The same fighting spirit displayed throughout his fatal illness marked his career as a wire chief. He was at his best in bad storm breaks, and no matter how bad the mix-up might be, nothing short of a total prostration of the lines would prevent him from getting a wire through to Port Jervis, a task in which his genial nature always won full cooperation along the division.

Mr. Hill was the father of four sons and a daughter, two of the former and the latter having preceded him to the grave. The sincere sympathy of a host of friends went to the bereaved wife and the remaining sons at the funeral services at his late residence in Jersey City on October 3.

Louis C. Bader, telegraph operator on the Chicago Tribune-Denver Post special wire, died on September 28th at St. Luke's hospital, following an operation for tuberculosis of the hip, performed recently. He also suffered from a stomach ailment for which physicians were unable to give him relief.

After the operation, Mr. Bader rallied for a time, but, when he noted that he was not making the progress toward recovery he had expected, he called Mrs. Bader to his bedside, and told her he did not expect to live more than two days.

Then, with her help, he made arrangements for his funeral, expressing the wish that he be buried from his home, 1395 South Cherokee street and from St. Francis de Sales church, and that his body be interred in Fairmount cemetery. These details, Mrs. Bader said, would be carried out, the funeral taking place at 2 o'clock on October 1st.

Mr. Bader had been a resident of Denver for fifteen years, and before coming here he had handled the wire of a large grain brokerage house at St. Louis.

He is survived by his mother, who is ninety years old, his wife, who lives at 1395 South Cherokee street, and two sisters at St. Louis, where his mother also lives.

J. H. CHAPMAN, a pensioned supervisor of the Commercial Cable Company, London, England, only about two years ago when he was himself pensioned, died in that city on September 3rd.

D. H. KEELEY, superintendent of Government Telegraphs, Ottawa, died recently. He served several years under the late F. N. Gisbourne, projector of the first Atlantic cable.

Samuel F. B. Morse—His Letters and Journals

WE have just been able to purchase two hundred copies of the book entitled "Samuel F. B. Morse, His Letters and Journals," two volumes, which have been selling for $7.50 per set net. We will sell these books while they last for $3.00 per set. Here is a chance to get a fine book of Professor Morse's doings in the telegraph. The book was edited by Edward Lind Morse, his youngest son. The work is illustrated with reproductions of his paintings and with notes and diagrams bearing on the invention of the telegraph.

Edward Lind Morse says: "My desire has been to present a true portrait of the man, with both lights and shadows duly emphasized; but I can say with perfect truth that I have found but little to deplore. He was human, he had his faults, and he made mistakes. While honestly differing from him on certain questions, I am yet convinced that, in all his beliefs, he was absolutely sincere, and the deeper I have delved into his correspondence, the more I have been impressed by the true nobility and greatness of the man.

His fame is now secure, but like all great men, he made enemies who pursued him with their calumnies even after his death; and others, perfectly honest and sincere, have questioned his right to be called the inventor of the telegraph. I have tried to give credit where credit is due with regard to certain points in the invention, but I have also given the documentary evidence, which I am confident will prove that he never claimed more than was his right. For many years after his invention was proved a success, almost to the day of his death, he was compelled to fight for his rights; but he was a good fighter, a skilled controversialist, and he has won out in the end.

He was born and brought up in a deeply religious atmosphere, in a faith which seems to us of the present day as narrow: but as will appear from his correspondence, he was perfectly sincere in his beliefs, and unfaltering held himself to be an instrument divinely appointed to bestow a great blessing upon humanity.

It seems not to be generally known that he was an artist of great ability, that for more than half his life he devoted himself to painting and that he is ranked with the best of our earlier painters."

When ordering address Telegraph and Telephone Age, 253 Broadway, New York.

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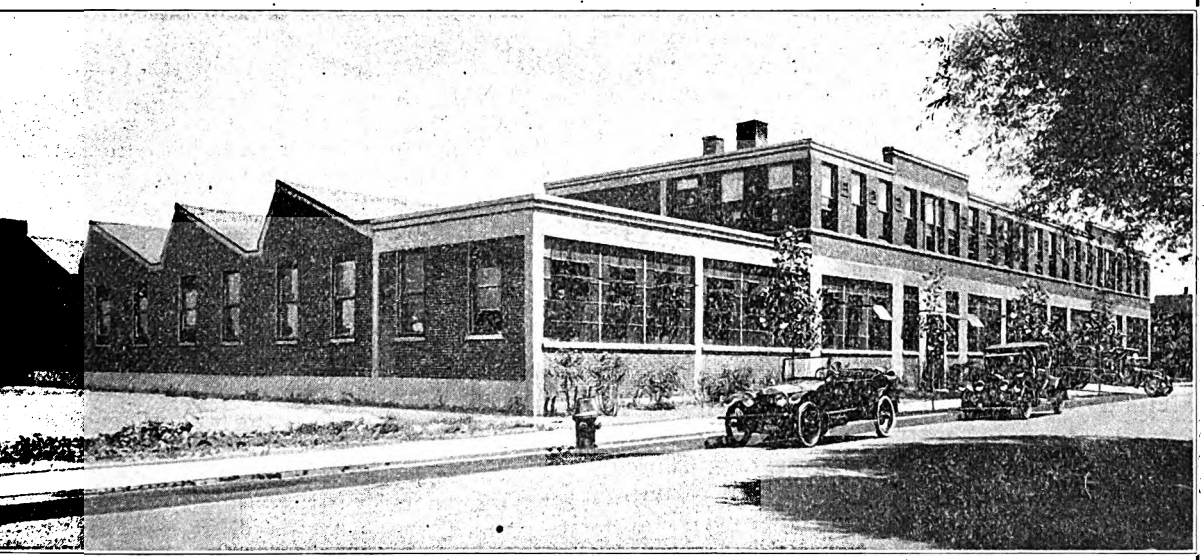

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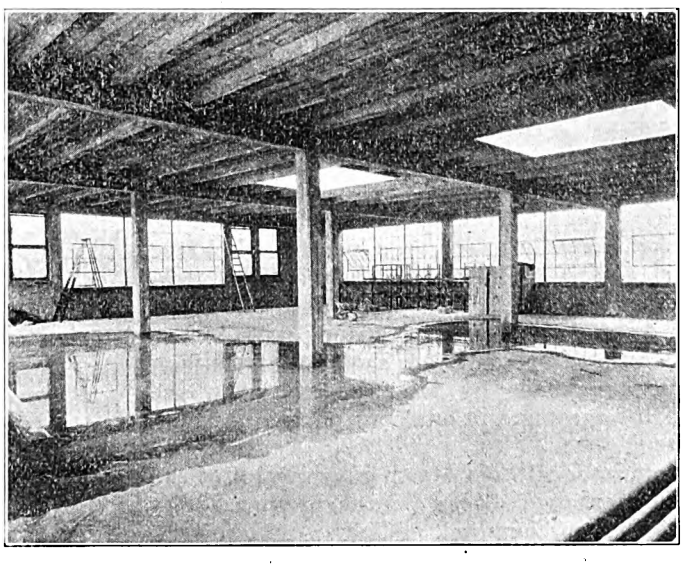

NEW ADDITION NEARING COMPLETION

MORKRUM COMPANY

CHICAGO NEW YORK

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PERSONAL

W. H. Hefler, assistant superintendent of telegraph of the International Mercantile Marine Steamship Company, was in town last week on business connected with the service.

POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice-president and general manager, has distinguished himself on the golf links by winning one of the club's championships at Wykagyl Country Club and one of the sweep-stake events. He has a habit of keeping his eye on the ball.

S. H. Mudge, general superintendent, Chicago, was a recent executive office visitor.

E. P. Tully, vice-president, is on an extended trip which will take him to the coast.

C. F. Leonard, general superintendent, Metropolitan Division, is taking a short leave on account of illness. We earnestly hope for his speedy recovery.

Caroline L. Porter, of the telephone department, New York City, was married to Edward J. Stack, on August 31st, at the St. Mary's Episcopal Church, Brooklyn. Members of the telephone department presented the bride with a set of table linen and a bouquet of American beauties. The happy couple spent their honeymoon in the Catskills. Best wishes for a long and happy wedded life are extended to the bride and groom.

The Company has opened an office in the Roosevelt Hotel, recently opened in the Grand Central district, New York City.

New York City

SYMPATHY of the force is extended to Miss Joyce of the Efficiency Department and Miss Norby of the Multiplex Department, in the recent deaths of their fathers.

Several of the quadruplex chiefs journeyed over to Hoboken recently to see the Operator-Blackface Comedian, George Hunter, perform. They pronounced his act O.K., after George lined out a few wise cracks and put over some snappy songs.

The Multiplex operators are shooting at the high mark recently made by Miss Farrell when she punched 102 messages in one hour on the Philadelphia Circuit.

The International Polo Match gave several of the Morse men a chance to get a close-up of New York's celebrated four hundred. Operators, Powers, Wolff, Campbell, McMahon and several others journeyed to Meadowbrook Field, Long Island, and after giving the Prince, and the rest of the Elite the once over, got down to business putting the file over.

C. M. Baker, general superintendent of plant, Postal Telegraph Cable Company, Chicago, in renewing his subscription for another year writes: "I enclose herewith check for $2.00 for renewal of subscription to the Telegraph and Telephone Age.

I am always glad to see the little yellow back show up on my desk. It keeps me in touch with my friends and acquaintances in the telegraph and telephone field."

WESTERN UNION TELEGRAPH CO.

Newcomb Carlton Injured by Taxi

NEWCOMB CARLTON, President of the Western Union Telegraph Company, was knocked down and seriously injured by a taxicab on October 4th as he was crossing Vanderbilt Avenue at Forty-third Street shortly after he had left the Grand Central Terminal.

Mr. Carlton refused the offer of a policeman to call an ambulance, and went to his home at 27 East Seventy-second Street in a taxicab. A few minutes afterward he became unconscious, and when Dr. Adrian Lambert of 168 East Seventy-first Street arrived he found that Mr. Carlton was suffering from concussion of the brain and a fracture of two ribs on the left side.

Reports from the Carlton home on October 5th were that the concussion had cleared, but that in order to permit the fractured ribs to knit properly it would be necessary for the injured man to remain in bed for two weeks.

Other physicians were called in consultation, and after the extent of Mr. Carlton's injuries had been determined the doctors advised that Mr. Carlton remain in bed for at least two weeks and refrain from any activity for six weeks. Dr. Lambert said the ribs were fractured at a point close to the spine underneath the shoulder bone, where they would be difficult to set. The doctor spent the night with his patient.

ON WAY TO YACHT CLUB

On October 4th Mr. Carlton visited his son, Winslow, who is a student at the Choate School at Wallingford, Conn. He returned to the city shortly before 9 o'clock and planned to meet Mrs. Carlton who was returning from a visit to Boston, at the Grand Central Terminal. Having an hour to spare he decided to walk over to the New York Yacht Club at 37 West Forty-fourth Street and dine there. He was on his way to the club when the accident occurred.

As Mr. Carlton stepped off the curb at Vanderbilt Avenue and Forty-third Street a northbound taxicab driven by Connells Jayes of 7,212 Fourth Avenue, Brooklyn, came up on the west side of the avenue. A large trunk was strapped on the front next to the driver's seat. Mr. Carlton was struck a glancing blow by the trunk and knocked down.

The taxicab at once pulled into the curb, and Patrolman Small of the East Fifty-first Street station came up. The policeman offered to call an ambulance and have Mr. Carlton taken to his home. The Western Union President made light of the accident at the time and said he preferred to go into a taxicab. As Mr. Carlton refused medical attention at the time of the accident no action was taken against the taxicab chauffeur.

On his arrival at his home Mr. Carlton collapsed and Dr. Lambert was called in. Mrs. Carlton arrived soon afterward and took charge of her husband. She said that his condition was as favorable as could be expected.

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Besides being President of the Western Union Telegraph Company, Mr. Carlton, who is fifty-five years old, is a director of the American Express Company, American International Corporation, Chase National Bank of the City of New York, United States Rubber Company, Union Pacific Railroad Company and a number of other corporations. He is a trustee of Columbia University, the Stevens Institute of Technology, Metropolitan Museum of Art, New York Zoological Society and other institutions. He is a member of the New York Yacht Club, Union, Century, India House and Columbia University Clubs.

Mr. Carlton married Josephine Winslow Smith of Buffalo N. Y., on October 31, 1906. He was graduated from Stevens Institute of Technology in 1890 and practiced as a mechanical engineer in Buffalo. He was Director of Works of the Pan-American Exposition in 1902 and soon after joined the staff of the Bell Telephone Company of Buffalo. Later he was associated with the Westinghouse Electric Company and became managing director in London of the British Westinghouse Electric and Manufacturing Company. In 1910 he became Vice President of the Western Union Telegraph Company and since April 15, 1914, has held the position of President of that company.

Death of William A. Sawyer

WILLIAM A. SAWYER, aged sixty-six years, superintendent, First District, Eastern Division, New York, died on September 26th. He had been suffering for a long time from high blood pressure.

Mr. Sawyer was born in New Haven, Conn., November 11th, 1857, and entered the telegraph service as a messenger for the Western Union Telegraph Company in 1870. He became manager for the Mutual Union Telegraph Company at Waterbury, Conn. on opening their lines for commercial business and he remained with them until absorbed, doing a large amount of business for the opposition. On the Mutual Union's death he organized the Waterbury District Telegraph Company, one of the most successful district systems in the United States, having an extensive night watchmen's and burglar alarm plant, besides doing a phenomenal messenger service. Originally this company was operated in connection with the American Rapid Telegraph Company, and later with the Bankers and Merchants. In 1887, Mr. Sawyer transferred the company from the opposition to the Western Union Telegraph Company, still maintaining, however, a separate office, until January 1st, 1894, when both companies moved into one office under his management. The Waterbury Company is now a part of the American District Telegraph and Messenger Company's System and in addition to his position as manager at Waterbury, Mr. Sawyer was also superintendent of construction for the American District Telegraph Company of Connecticut. Although a very busy man, Mr. Sawyer was an ardent sportsman, and many trophies of his skill as a hunter adorned his home.

When the changes incident to the Western Union and the American Telephone and Telegraph Company combination resulted in the separation of the two interests, Mr. Sawyer was appointed superintendent, First District, Eastern Division. He had been in the service of the Company for fifty-four years.

O. J. NOURSE, general inspector in the office of vice-president of traffic, who has been in a hospital at Sherbrook, Province of Quebec, for the past three weeks, has returned to New York.

Philo Holcomb, general inspector, is laid up with rheumatism at his home in Atlanta, Ga.

The Western Union Employees Association, together with the operating vice-presidents, are now having their annual meeting in the executive offices in New York.

The new cable to Spain was complete to Malaga on October 7th, and it is now in the hands of the inspectors.

NINE thousand five hundred prize suggestions have been submitted to the divisional committees, who are now considering them, and after examination by the divisional committees they will be forwarded to New York for further examination and the prizes awarded by L. McKisick, chairman of the Central Committee.

Burton Is on Duty

W. M. BURTON assumed duties as manager of the Western Union Telegraph Company's office in South Bend, Ind., following B. J. Graybill who resigned and who is now in Atlantic City, N. J., temporarily. Mr. Burton has been connected with the organization for the last ten years and has been covering various assignments from coast to coast. He comes to South Bend from Kalamazoo, Mich., where he has been for the last year.

First Telegraph Line to Fort Worth Just Fifty Years Ago

A VETERAN telegraph operator, who, in 1864 sent the first message from the office in Fort Worth to Dallas, was a recent visitor at Dallas. He is Max Elser, now a prominent business man of Fort Worth.

"Friday," he said, "will mark the fiftieth anniversary of the completion of the first telegraph line from Fort Worth to Dallas. On this date fifty years ago I sent the first message to the then mayor of Dallas, from the then Mayor W. P. Burts of Fort Worth."

This first line, Elser said, was constructed by Frost and Euser, contractors of which he was a member.

"At that time the Dallas office operated three wires, and the office force consisted of a manager and operator," J. S. Burton was manager and E. J. Smith, operator.

"Today the office in Dallas has between four and five hundred employees and nearly three hundred wires, of which fifty are to Fort Worth."

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New Manager for Western Union at McKinney

J. E. BARRY, former manager of the local office of the company in McKinney who has been elevated to the post of commercial agent of the company at Oklahoma City, has been succeeded by W. M. Hunt, late of Gonzales. Mr. Hunt's home is at Sherman. During Mr. Barry's service with the company at McKinney he made scores of friends who regret his departure, but note his advancement with pleasure.

New fixtures are being placed in the local office. The office will soon be arranged in more convenient and up-to-date appearance, Mrs. Artelle Kinney, an attache of the office, said..

Veteran Telegraph Men Form Association

WESTERN UNION employees who have been with the company 10 or more years met recently at Milwaukee at the Athletic club and organized the Western Union Senior club. The purpose of the club is to commemorate the memory of Samuel F. B. Morse, collect historical data pertaining to the telegraph profession and to promote social activities among the old-timers in the telegraph service in Milwaukee.

Colonel Robert Ewing

A FEW days ago a delegation of newsboys waited on Colonel Robert Ewing, proprietor of the New Orleans States, New Orleans, La., and left with him a silver loving cup and a quaint-lettered framed parchment scroll.

Thus read the scroll:

"Colonel, there ain't nothing much closer to a feller than his own birthday. Today's yours. We kind of wanted to let you know we're for you. It's a long time since you was hustling for your living like we do, but you done it. You ain't forgot. And we ain't forgot you was a Western Union messenger boy once. There's another thing you ain't forgot. You ain't never forgot to give us the kind of a square deal you used to want when you was working like us.

"Here's hoping you have a lot more of these birthdays, Colonel. You've earned 'em. And take it from us, it's a pleasure to hustle selling the kind of a newspaper a square shooting guy like you gets out. We're proud to work for you. And we're prouder to think you're our friend.

"Many happy returns of the day, Colonel."

Colonel Ewing read the newsies message. He lifted the massive silver loving-cup, on which Coleman Adler's artistry had engraved a newsboy, with his bundle of The States under his arm, and the inscription below:

Colonel Ewing set down scroll and loving-cup upon his desk. He looked around at the group of coatless young merchants packed solidly in front of him.

"I want to thank you from the bottom of my heart—" he began. And then the publisher of The States had to take off his glasses and wipe them very busily. Strangely, his eyes needed drying, too.

A sort of a friendly grin went the rounds in front of him. They understood, that bunch. They'd caught the Colonel off first base and put one over on him!

Then he looked at 'em and smiled. And the grins in front of him widened.

The talk that followed? That's sort of personal between the States' publisher and the young merchants who sell the product. But it's violating no confidence to reveal that he told 'em about the days when as a Western Union messenger he used to deliver telegrams at a newspaper office next door, and learned even then to respect the newsies whether it came to work, fight, frolic or baseball game. And there was a little practical talk on the sort of stuff the ex-messenger boy had found had helped him, and the promise that every guy in the gang could look at The States publisher as a sort of second dad to whom to come when there was trouble camping on the doorstep. That private office was open to 'em when they needed to come to it.

They trooped out after a burst of applause, still grinning pleasantly.

A regular guy had talked to 'em in their own language. They understood.

And the silver cup and illuminated scroll they left behind them—well—you'll find them in places of honor in the private office of the publisher of The New Orleans States. And they're due to stay there in places of honor while Colonel Ewing occupies that office.

First Radio World's Fair Breaks All American Trade Show Records

THE latest report on the First Radio World's Fair which closed in Madison Square Garden and the 69th Regiment Armory, New York, at twelve o'clock on September 28th, indicates that it was without doubt the most successful trade exposition ever staged in America. The patronage was almost twice that of any previous industrial exhibition in this country and the amount of business transacted by the concerns participating broke all records.

The Exposition was attended by 175,000 people during the week it was open and thousands were turned away daily. On a dozen or more occasions Fire Department Officials temporarily closed the doors because of the fact that both huge auditoriums were packed to the rafters.

Over $3,000,000.00 worth of orders were booked by the exhibitors during the first six days of the show. Four companies succeeded in disposing of their entire 1924-1925 output, while three others actually oversold their maximum factory production for the coming year from ten to thirty per cent.

Three thousand and six hundred radio dealers and jobbers from the United States and Canada attended the Fair and close to five hundred more came from South America, Europe and The Orient.

The exhibits, all of which were of the de luxe variety, were installed by one hundred and eighty nationally known American manufacturers and twenty of the most prominent wireless laboratories of England, France, Germany and Japan. A good

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d fortune was spent on the booth and decorative ipment which was by far the most artistic and ctical ever seen in New York.

General Manager James F. Kerr and Managing ector U. J. Herrmann have already completed ar- gements for their 1925 Radio World's Fair, which be held in the New Garden soon to be erected John Ringling and Tex Rickard. Messrs. Herr- nn and Kerr have taken an exclusive ten year se on the new Ringling-Rickard building, which l be the largest and finest exposition hall in the rld. In spite of the fact that the new building l be twice the size of the present structure, Man- r Kerr reports that eighty per cent of the available nibiting space has already been contracted for. is more than likely that the Second Radio World's ir will be compelled to remain open one month stead of one week in order to accommodate even small percentage of the radio fraternity of this cality alone.

The outstanding feature of the exposition was e perfect managerial ability displayed by Messrs. errmann and Kerr. The enormous spectacle was rried off without the slightest hitch.

National Radio Conference

THE first general session of the Third National adio Conference was held at 8.00 p. m. on Monday, ctober 6, in the Auditorium of the Interior De- artment Building, corner of Eighteenth and F treets, N. W., Washington, D. C.

Arrangenents were made for broadcasting the pening session of the Radio Conference. The pening address was given by Herbert Hoover, ecretary of Commerce, beginning at 8.15 p. m. Following this, there were brief addresses by C. P. Edwards of the Department of Marine and Fish- ries, Ottawa, Canada and Mr. Pablo Torres of he Cuban Radio Service. Mr. Edwards and Mr. Torres have been invited to participate informally n the sessions of the Radio Conference on account of the interest which Canada and Cuba have in adio broadcasting.

The entire United States was covered by the broadcasting stations which were connected up for his occasion; the number of stations and area covered being larger than on any other previous oc- casion, with the exception of Defense Day and one other demonstration which took place several months ago. The stations which were included in this circuit are as follows:

WCAP, Washington; WEAF, New York; WJAR, Providence; WGR, Buffalo; WMAF, South Dartmouth; WLW, Cincinnati; KSD, St. Louis; WDAF, Kansas City; KDKA, East Pittsburgh; WOAW, Omaha; KGO, Oakland; WMAQ, Chi- cago; WCCO, Minneapolis; WOO, Philadelphia; WTAM, Cleveland; KLZ, Denver.

J. E. Zeublin, son of the late J. E. Zeublin, general superintendent of the Baltimore and Ohio Tele- graph Company, Chicago, whose death was reported from Switzerland last week, was a promising young lecturer.

Declaration of Dividends

Marconi's Wireless Telegraph Company, Limited.

NOTICE TO HOLDERS OF SHARE WAR- RANTS TO BEARER.

Notice is hereby given that the following DIVI- DENDS will be PAYABLE on and after Sep- tember 18th, 1924:—

On the SEVEN per CENT. CUMULATIVE PARTICI- PATING PREFERENCE SHARES. Dividend for the year 1923 of 7 per cent. being 1s, 4.8d. per share, less Income-tax at 4s. 7½d. in the £. (Net amount 1s. 0.915d. per Share.) Coupon No. 26.

On the 2,750,065 ORDINARY SHARES. Numbered 1 to 500,000, and 750,001 to 3,000,065 inclu- sive. Dividend for the year 1923 of 10 per cent., being 2s. per Share, less Income-tax at 4s. 7½d. in the £. Net amount 1s. 6.45d. per share.) Coupon No. 25.

Coupons may be lodged at the Head Office of the Company, Marconi House, Strand, London, W.C.2, and must be left four clear days for the purpose of examination and preparation of Divi- dend Warrants.

Coupons will also be payable at the following places, at the exchange of the day:—Banco di Roma, Rome and Branches; Banque d'Outremer, 48, rue de Namur, Brussels; Hanover National Bank, New York.

The necessary forms for lodging Coupons may be obtained from any of the above addresses, or from the Office of the Company, Via dei Condotti, 11, Rome; The Marconi Wireless Telegraph Com- pany of Canada, Limited, Marconi Building, 11, St. Sacrament-street, Montreal; Radio Corporation of America, Woolworth Building, 233, Broadway, New York.

By Order of the Board,

A. OGLE, SECRETARY.

Marconi House, Strand, London, W.C.2, Sep- tember 5th, 1924.

New Edition of Beginner's Manual of Submarine Cable Testing and Working, by G. M. Baines

Beginner's Manual of Submarine Cable Testing and Working, by G. M. Baines, has been thoroughly revised by its author and it was issued in fourth edition form on June 1, 1921. The book is primar- ily for students in submarine telegraphy. All of the subjects on submarine telegraphy demanding atten- tion have been brought within the scope of this vol- ume, and have been dealt with, if not exhaustively at least at sufficient length to enable an intelligible idea to be obtained of them, which will admit of wider extension later. The book measures 5½ inches wide by 8½ inches long and contains 174 pages fully illustrated. The price of the work is $4.50 per copy, and it may be obtained at the office of TELEGRAPH AND TELEPHONE AGE, 253 Broad- way, New York.—Advertisement.

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Acme Commodity and Phrase Code

THE Acme Commodity and Phrase Code, price $30.00, has just been placed on the market. It seems as though the last word has been spoken in cable codes, but the authors tell us that their code is the best so far devised, and will meet with every success. The Acme Code is no exception. This code consists of one hundred thousand five-letter code ciphers with at least two-letters difference between each and every word. No transposition of any two adjoining letters will make another word in the book, and it is asserted that it is the first time this feat has been fully accomplished for 100,000 words.

Another merit is that one-letter mutilations practically detect themselves.

Elimination of transpositions make for better transmission of messages, which is the object sought both by cable companies and users.

It enables cable companies to give more perfect service and when errors do occur, makes detection of mutilation easier.

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Claims made for facility and simplicity in coding messages thereby saving words and cost have usually been disappointing. The Acme Code has been compared with all general codes and proved its worth. Even against a complicated and comprehensive private lumber code with which a test was made, the Acme Code effected a saving. We request users to test the merits of the code for themselves and be convinced.

Its easy and simple operation, combined with saving in cost commends its use for domestic as well as foreign messages.

Intelligent, sustained, and experienced effort has been made to correct the known shortcomings and deficiencies in codes generally.

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Only by a thorough examination will the worth of these be understood and appreciated.

Address all orders and make remittances to Telegraph and Telephone Age, 253 Broadway, New York.

Telegraphers of Today

WE find that we have on hand quite a number of copies of "Telegraphers of Today," which is a book made up of 354 pages, printed on heavy coated paper measuring eleven inches wide by fourteen inches in height. This large book contains over a thousand sketches of telegraph people, together with a biography of their lives. It is a splendid work and was printed in 1894. It is used extensively in the libraries of prominent telegraph and railroad people. While these books last, we will sell them at $5.00 each and we will prepay the carrying charges. Address and make remittances to Telegraph and Telephone Age, 253 Broadway, New York.

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INSURANCE, $500.00 in payments of $50.00 per Month to Beneficiaries for Ten Consecutive Months.
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Telegraph and Telephone Age

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No. 21 NEW YORK, NOVEMBER 1, 1924 Forty-second year

CONTENTS

PAGE

Capacity 484
Gave College its $2,000,000 Building 485
Extension of Standard Radio Frequency Transmissions. The Wireless Voice 486
Statement by David Sarnoff, Vice-President and General Manager of the Radio Corporation of America 487
Fifty Miles from Nowhere. By W. Lee Dickson 490
Portland, Oregon, Broadcasting Station 492
J. Frank Howell 493
Tartartic Acid Crystals. By Wix 494
American Telephone and Telegraph Company. Telegraph and Telephone Life Insurance Association Secures Exclusive Services of Thomas E. Fleming 495
Editorials 495
Self-Governing Radio. Radio in Hospitals. Old Time Telegraphers 496
New York Telegraphers' Aid Society 499
Postal Telegraph-Cable Company 500
Western Union Telegraph Company. Direct West India Cable. Radio Corporation of America 502
Telephone Operators write language of their own in keeping record of Long Distance Calls 503
The Kellogg Press. What did Mr. Edison Sine 504
Why Some Succeed and Others Fail. By W. H. Jones 505
Communication from Point to Point at Railroad Terminals 506

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Capacity

ELECTRIC CHARGE—A battery, a generator or other source of current supply has the ability to send an electric charge through a circuit which may not be a closed circuit in the sense that was stated in the consideration of Ohm's law. Such a circuit is one that includes an electric condenser. An electric condenser is generally called simply a condenser, in the consideration of electrical problems. Any two conducting materials separated from each other by an insulating material is a condenser. A telephone condenser generally consists of two long sheets of tinfoil separated by paraffined paper, all of which is rolled up and placed in a tin can and sealed with pitch to make it moisture-proof. Terminals connected to each of the two sheets of tinfoil are provided. Another example of capacity is the two wires of a cable pair which are separated by paper or rubber insulation. Each wire of the pair also exhibits the capacity effect between itself and the earth or the other wires of the cable. An open wire line also shows capacity between the two wires, in which case the air is the insulating material. These wires each have capacity to ground also.

CONDENSER CHARGE—Assume that a condenser has not been connected before, to the source of electromotive force, and that one side of it is now connected to the battery. Nothing happens when this is done, so far as is apparent in any current measuring instrument that might be in the connection as a detector. Now connect the other side of the battery to the condenser and the current measuring instrument will indicate a sudden flow of current from the battery through the condenser. The duration of the current flow will be very brief after which the circuit seems as though it were open again. If the circuit is now broken no electrical action appears to take place.

If the circuit is closed again without reversing the connection; that is, without changing the polarity of the battery with relation to the condenser, nothing will happen because the condenser was fully electrified or "charged" by the first connection and as none of this charge was taken out when the circuit was opened none will flow in now.

If the charged condenser is removed from the circuit and tested with a voltmeter it will be found to exhibit some characteristics of a battery itself. It will show that the side of it that was connected to the positive pole of the battery will now indicate that it is the positive pole of the condenser and the side that was connected to the negative pole of the battery will indicate that it is the negative pole of the condenser.

CONDENSER DISCHARGE—If a circuit is now provided through a resistance by connecting the resistance across the charged condenser there will be a sudden flow of current from the condenser through the resistance and after this has taken place there will be no more charge apparent in the condenser. It is now said to have discharged itself. All the current that flowed in has now flowed out; that is, charge and discharge are equal. The current that flowed during the discharge was in the opposite direction to the flow that charged it.

After being discharged, the condenser can again be charged by connecting it once more to the battery. Another way to make current flow in the condenser circuit after it has been charged is to reverse the connections to the condenser from the battery. This will connect the terminal that is charged positive, to the negative pole of the battery. Now when the circuit is closed by touching the positive pole of the battery to the side of the condenser that was negative there will be another sudden rush of current. This current will be twice as much as the previous charging current or the previous discharge current because the charge that was in the condenser flows out and a new one flows in but the current flow is in the same direction for both the discharge and recharge. The discharge and the charge are thus inextricably mixed together and appear in the current indicating instruments as one impulse of current of double the amount that composed the charge of the uncharged condenser or the discharge of it through the resistance.

If the condenser were now measured for the strength of its charge it would be found to have no greater voltage across its terminals than it had when it was first charged from its empty condition as at first explained. It would be found to send no more current through a resistance on the discharge arrangement, than it did the first time. The only difference is that its polarity was reversed from what it was the first time. This charge and discharge method is used by the wire chief in common battery central offices as a means to tell when a subscriber's line is clear and the receiver is on the hook, in which case the condenser in the telephone set can be charged and discharged.

ELECTRIC FIELD—The current that flows into the condenser when it is charged, establishes a field of electric force between the plates of the condenser. These are generally shown as extending from the positive plate toward the negative plate through the insulating material. All materials except current conducting materials have the ability to hold these lines of electric force as though there was nothing but a vacuum between the plates. These lines of electric force must not be confused with the lines of magnetic force that exist while current flows. Such magnetic lines are closed loops. These electric force lines are not closed loops but begin on one plate of the condenser and end on the other. The strength of the lines, that is, the voltage from one end of them to the other end depends on the voltage of the battery that caused them. The voltage that is found across the plates of the condenser is in general equal to the voltage of the battery that caused the charge. The electric lines of force do not die out when the voltage of the charging battery is removed and the circuit is opened, as the mag-

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tic lines did when their resistance circuit was ened. They will remain until the condenser is scharged, which may happen by discharging it as scribed with a resistance, or they may leak off e to poor insulation material in the condenser. ne lines of force constitute the electrical field or x of the condenser.

The number of lines of electric force established nen the condenser has been charged will depend on the area of the plates, the distance they are art and the material they are separated with, as ell as upon the voltage of the charging battery. he closer the plates are together, the greater will the capacity of a condenser. A condenser with ica or one of the several other materials between e plates will have greater capacity for the same ze plates and separation, than one with the air etween the plates. The larger the plates the reater will be the capacity for condensers of the me material between the plates and same separaon of plates. The number of lines of force has constant relation to the quantity of the charge or any condenser. The quantity of the charge or he "charge" as it is more frequently called, is generlly used rather than the number of lines of force r flux, as it is called, because the constant relation etween charge and flux.

CHARGE VALUE—The charge in a condenser is qual to the voltage across its terminals multiplied y the capacity, which in equation form is $Q = V C$. The capacity is expressed in farad if the charge s in coulombs and the potential is in volts. The farad is so large that it is seldom mentioned in practice and the millionth part of it, which is the nicro-farad is used. The term coulomb is seldom used in practice and in fact the quotation is seldom used outside of physics laboratories.

The charge that is placed on the plates of a condenser by a battery or generator is the same sort of electricity as is produced by friction, as in the static machines that were commonly seen a few years ago. The battery and the generator are capable of causing a continuous flow of electric charges in a circuit which is composed of simple resistance.

STORED ENERGY—The energy that is stored in a condenser when its plates have a difference of potential is the product of the capacity and the square of the voltage, divided by two. In equation form this is

$$W = \frac{C\ V2}{2} \quad \text{watt seconds,}$$

if C is farad and V is volts. This is the energy that will be given out by the condenser when it is short circuited or otherwise discharged after being charged to the potential V. If it is short circuited the energy will be dissipated in a spark and if it is connected to a circuit of resistance it will be used in heating the resistance.

The stored energy in a condenser and also the stored energy in a coil due to inductance, when concerned in alternating current transmission, of which telephone transmission and alternating current power transmission are examples, are given back into the circuit without loss. This can occur because the circuit is not opened up as was the relay circuit which was described in connection with inductance and consequently no spark appears when the inductance or the condenser lose their stored energy in such closed circuits.

CONDENSER IN SERIES—Condensers in parallel simply add up their capacities. When they are in series the combined result is that the potential of the three adds up to the value of the potential that charged them. The charge on each is exactly the same, as is apparent from the fact that the charging current passed through each in series and could be no more in one than in another. The potential and the capacity of each being different and the charge in each being the same, gives a relation as follows: $Q = C_1 V_1 = C_2 V_2 = C_3 V_3$, and the combined series capacity is

$$C = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}}$$

—Telegraphy and Telephony By C. S. RHOADS.

Gave College its $2,000,000 Building

THE giver of the $2,000,000 Lawyers' Club building at the University of Michigan, one of the finest buildings of its kind on any campus in the world, is William W. Cook, Michigan alumnus and a New York City lawyer. This was learned on September 20th.

The identity of the giver has been a mystery for two years and has been revealed only through discovery of an inscription bearing Mr. Cook's name, found on a small stone panel over a door leading to the lounge of the club.

William W. Cook, one of America's most vigorous advocates of the government control of railroads, became especially conspicuous in 1917 when he drafted an elaborate plan incorporating his views on the railroad problem. This plan, emphasizing the importance of federal railroad control and financing without actual ownership, was presented to Senator Francis G. Newlands, chairman of the Senate committee on interstate commerce, and later submitted for congressional action.

In 1919 Mr. Cook, then general counsel for the federally controlled Postal Telegraph Cable Company, was deposed with several other officials of the company by Postmaster-General Burleson. Mr. Burleson charged these officials with having failed or refused to follow instructions with having tried to embarrass government control, and with having failed promptly to put a new wage schedule into operation. Several months later, when the government had surrendered its control of the concern, the Postal Telegraph Cable Company reinstated these officials.

Mr. Cook was born in Hillsdale, Mich., and is sixty-six years old. He received his A. B. degree at

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the University of Michigan in 1880. Two years later he was graduated from the law college at Ann Arbor, and was admitted the following year to the New York state bar. Since that time he has become one of the leading corporation lawyers of New York city, having represented at various times the Commercial Cable Company, the Commercial Pacific Cable Company, the Mackay companies and other large concerns.

Mr. Cook has written several legal treaties, his "Book on corporations" being regarded as a standard text.

He is a member of the Union League and Lawyers' clubs, and has offices at 61 Broadway. His home address is 14 East Seventy-first street, New York.—*Boston Herald.*

Extension of Standard Radio Frequency Transmissions

FOR the past two years the Bureau of Standards of the Department of Commerce has been transmitting at stated times radio signals of standard frequency from the Bureau of Standards radio laboratory at Washington, D. C. These signals are transmitted approximately twice a month and have been utilized throughout the eastern half of the country.

In order to extend the territory covered, transmitting equipment and standards have been installed at Stanford University, California, with the cooperation of that institution. The station thus established at Stanford University on September 5, inaugurated the transmission of similar signals of standard frequency, thus duplicating in the west the service rendered by the Bureau of Standards in the east.

The frequencies included in the past transmissions have been from 125 to 2,000 kilocycles (2,400 to 150 meters.) In order to make the transmissions of still greater service, they will be extended to include frequencies up to 6,000 kilocycles.

These special signals of standard frequency are of use to testing laboratories, transmitting station operators and others in standardizing wavemeters and adjusting transmitting and receiving apparatus. The accuracy of the frequencies is better than three-tenths of 1 per cent.

All transmissions are by unmodulated continuous-wave telegraphy. A complete frequency transmission includes a "general call," a "standard frequency signal," and "announcements." The "general call" is given at the beginning of the 8-minute period and continues for about 2 minutes. This includes a statement of the frequency. The "standard frequency signal" is a series of very long dashes with the call letters (WWV or 6XBM) intervening. This signal continues for about 4 minutes. The "announcements" are on the same frequency as the "standards frequency signal" just transmitted and contain a statement of the measured frequency. An announcement of the next frequency to be transmitted is then given. There is then a 4-minute interval while the transmitting set is adjusted for th next frequency.

The Wireless Voice

WHEN you sit at home and listen to the pleasant friendly voice that comes over the wireless to en tertain and charm you with what is really nothin more than an interesting talk, you probably do no realize that what appeals to you most is the voic of the lecturer.

The voice is really more important than the mat ter, and however interesting a man's "Talk" ma be, he is likely to fail as a broadcaster unless h has the wireless voice. Just as a stage comedia may fail to get his excellent patter "over" owing t an unfortunate manner, or lack of confidence, s a wireless "talker" may fail unless he possesses, o is able to cultivate the right tone of voice for broad casting.

Many a popular lecturer submits for broadcastin purposes an excellent light chat on an interestin subject, but when he is put up in front of the mi crophone for rehearsal a few sentences are ofte sufficient to show that he has as much chance o holding the attention of his unseen audience wit his little talk as if he stood and recited his multi plication tables. When that happens he is either given a rapid course of instruction in broadcasting, or his material is sent over the wireless by an ex perienced broadcaster specially chosen because o his wireless voice.

Experience has shown that public speakers are often the worst broadcasters. They don't seem able to rid their minds of the idea that they are addressing a huge public meeting. They pitch their voices too high and they speak too loud. They have the "platform sense" which is fatal to good broadcasting. The platform tone is not required. It is the fireside voice that is needed.

Parsons as a rule make poor broadcasters. They are too accustomed to addressing large congregations, and their calling helps to develop an artificial, unnatural intonation. Harsh, strident voices, of course, are almost useless for broadcasting.

Production on the stage is a matter of sight and sound. Production on the wireless is a matter of sound only. The ideal broadcasting voice is a clear pleasant voice with a strong sympathetic note. A voice that comes easily, without effort. Above all, a friendly voice. Elocutionary ability is rarely of any value for wireless talks because the elocutionist's delivery is stagey and unnatural. It isn't "homely" enough. The "intense" voice is a failure from the broadcasting point of view because it is rarely used in ordinary everyday conversation.

Just So

Minister: "Do you take this man for better or for worse——"

Bride: "No, sah. Jes' as he is. If he gits any better he'll die, an' if he gits any wuss I'll kill him myself."

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atement by David Sarnoff, Vice-President and General Manager of the Radio Corporation of America, at the Third Annual Radio Conference in Washington

In contributing to the discussion at this Conference, I desire first to thank the distinguished Secretary of Commerce, Herbert Hoover, for the very le manner in which he has crystallized the great ture and destiny of radio broadcasting, and for e splendid encouragement he has lent to the proess and development of radio not only in the ld of broadcasting, but also as a transoceanic mmunication system and as an all important nk between ship and shore and from ship to ship. It would be a superfluous act to mend the clear nd unquivocal statement made by Mr. Hoover ith reference to the problems that face this Conrence. We are at the cross-roads of public serce and the direction that we now take will largely etermine the place of radio in our national life. Ve can choose the broad road of further research nd achievement that will carry the art to its highest estiny, or we can take the primrose path of easy ccomplishment and rest upon the facilities that lready have been created.

I share with Secretary Hoover the conviction hat in order adequately to fulfill the broadcasting nission, radio must develop into a national serice. By a national broadcasting service I mean service that will make every home in the country esonant with the music, entertainment and culture hat radio can bring; that will enable every man nd woman in the United States to receive the word of mouth messages broadcast by our great ublic men; that will create a vast forum of the air or the discussion and consideration of vital probems; and that will keep the remotest home in the and attuned to the thought and the doings of the reat world outside. And in this respect I hold stronger brief for the lonely prairie home where adio has become an essential utility rather than luxury, than for the dweller in many of our arger cities already well served by a multitude of ocal stations.

Nor would I stop with national broadcasting. The voices echoed by American radio stations already have been hurled across the oceans and messages broadcast by our public men have been heard in other hemispheres. The day is not far, when technical developments in the broadcasting art will enable our country, through super power stations, to reflect its culture and to speak its thought to other nations of the world, and at that time the United States will take the same position of leadership in worldwide broadcasting that it occupies today in worldwide radio telegraphic communication.

A Review of What Has Been Done

No more eloquent justification can be shown of the American principles of unfettered industry and untrammeled research than the progress made by radio in the United States in the few short years since broadcasting was begun. Today over five hundred broadcasting stations in the United States —more than in all of the rest of the world combined—lift their voices to the air with daily programs of music, entertainment and news. The radio public of this country is numbered in the millions compared to the thousands in other lands. The blight of bureaucratic control is not upon the American radio industry. No tax is imposed upon the radio listener. Continuous strides are being made both in transmission and reception, and our broadcasting stations are reaching out to ever widening ranges.

Elements working in different directions but towards the same end, have contributed to this happy result. The American Telephone and Telegraph Company has not only made many notable contributions to the radio art, but has developed a practical means of interconnection by wire, whereby isolated broadcasting stations in various parts of the country might be connected into one great broadcasting unit. It is conceivable that all broadcasting stations in the country could thus be linked together in an effort to establish a more or less national service based upon present facilities developed by radio industry. In offering a strong arm of support to a new and revolutionary system of communication the American Telephone and Telegraph Company has lived up to the highest traditions of public service.

An associate of the Radio Corporation of America, the Westinghouse Electric and Manufacturing Company, on the other hand, has been devoting the great resources of its organization to the development of a system of interconnection by short wave radio transmission. It has made striking progress in the direction of "rebroadcasting." It was experimentally demonstrated on the occasion of a public dinner in New York on March 7th of this year, that six leading broadcasting stations linked by radio could simultaneously transmit a program which could be heard as far west as Oakland, Calif., and across the Atlantic in Manchester, England. The possibilities of short wave transmission are yet untapped.

Short Waves to Supplement, Not Supplant

And here I desire to take the opportunity to correct certain misapprehensions which have arisen with regard to my position towards short wave development. On my return from a recent visit abroad, I made a statement of my observations there in which I said:

> "While in England, I saw a good deal of Mr. Marconi and his experiments with short waves. These experiments have given fresh impetus to the work of research men and radio engineers in the United States, where the short-wave field has been under scientific investigation for several years. It may be confidently expected that the use of short waves will immeasurably and in a practical way advance the art of radio communication in the field of wireless telegraphy as well as wireless telephony."

I further stated, that I had seen nothing abroad

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that would justify the claim, already made by some, that the present high power long wave stations employed for commercial transoceanic communication were about to be supplanted.

Due to a typographical error I have been widely quoted as saying that I saw nothing that would lead me to believe that wave transmission would "supplement" present high power facilities. This, of course, is not correct. I can go no further in indicating my confidence in this line of development than to say that the Radio Corporation of America is now equipping all its transoceanic stations with short-wave transmitters to supplement its regular long-wave transmitting facilities.

Attacking the problem of creating a national system of broadcasting from another important angle, the General Electric Company, another associate of the Radio Corporation of America, has made a notable contribution to the art, in the field of super-power development. It seemed fitting that the great engineering and industrial organization which brought forth the high frequency alternator that made regular transoceanic radio communication possible should now apply the principle of super-power to radio broadcasting. Through super-power we seek to serve directly, on an ever-widening range the thousands or millions of listeners within reach of the voice of the super-power station.

The Three Elements of Broadcasting

These then are the fundamental elements in the broadcasting situation from the standpoint of the art:

1. Stations of comparatively limited range connected by wire.
2. Stations linked and rebroadcast by short-wave transmission.
3. Super-power development for a service direct to large areas of the population.

I lay emphasis on this situation, because before we embark upon the organization of a program of radio broadcasting we must determine the direction of the art. Every line of development now in progress has added to the power and possibilities of radio; every effort deserves encouragement from the government, from the public, and from the industry itself. But to urge development in only one direction is to needlessly restrict it in another.

Radio is the most flexible system of communications discovered by man. It reaches out in all directions. It overcomes obstacles otherwise insurmountable. Its range is limited only by the strength of the impulse behind the signal. It is not fundamentally dependent upon wires which may be injured or destroyed. The permanent development of radio as a national system upon the basis of wire interconnection would not only lay a heavy burden upon the great wire plant of the country, but it would make largely abortive the true function of radio as a supplemental communication system—a system of transmitting intelligence without the use of wires and thus making our national and international communications independent of the accidents of peace or the exigencies of war.

Nor is interconnection, per se, whether by wire or by radio relay, the key to effective and reliable broadcast transmission on a scale that will reach every home in the land and that will give our agricultural regions of the West and the North the same measure of service received by the great metropoli from their local stations. Present stations differ in power, in capacity, and in type. Some have now become obsolete. Some are badly situated for the requirements of the broadcasting task.

Super-power Would Add Vastly to Present Facilities

Yet it is true, as Secretary Hoover has said that the local station at present is the most direct voice of radio in the community which it serves. It is neither the desire nor the purpose of the Radio Corporation of America, or of its associates, in the plan of national broadcasting development which I shall discuss here, to destroy the usefulness or restrict the opportunity of the local broadcasting station. Our plans are to add vastly to the facilities which now exist in order that any national broadcast program yet to be organized might reach ultimately to every home in the United States, and even make our voices heard in countries beyond the seas. To those who observe the trend of the art, it seemed apparent, even in the early stages of broadcasting that power was the driving force of radio development. It was the application of great power to the problem of transoceanic telegraphy that gave the United States a reliable transoceanic wireless telegraph communication system. Similarly, added power brought greater range to the broadcasting station. And the fact is incontrovertible that a broadcasting service in one step, of say 500 miles, must be more efficient and economical than service in five steps of 100 miles each. Yet when I publicly suggested the possibilities of super-power broadcasting as long back—as time goes in radio—as November, 1922, it was with the knowledge that major technical and other obstacles would have to be overcome.

Prepared to Start Super-power

We have travelled far since then, and it is my pleasure to inform you today that the Radio Corporation of America is ready to begin the immediate erection of a great super-power broadcasting station at some point outside of the City of New York, located with due regard to the minimum of interference with listeners and with local stations maintained by other interests and capable of serving directly millions of people within the range of its voice. We might go for the moment as high as 50 kilowatts, if no regulatory proposals are adopted that would limit the art.

When the range and usefulness of this station have been proved experimentally, the Radio Corporation of America would begin the construction of another super-power station at some point where the limit of reliable effectiveness had been reached by the first station. Thereafter in close technical and practical co-operation with its asso-

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ıtes the system would be extended to cover ery nook and corner of the United States. Our ırpose would be to equalize the broadcasting rvice received in every part of the country. In der, also, to add to the effectiveness of the great per-power broadcasting station to be established us, means will be provided at the station for e purpose of relaying programs to other points the United States and abroad.

OCAL STATIONS PART OF SUPER-POWER PLAN

Not only is it proposed eventually to interconect this great group of super-broadcasting staons, but interconnection could also be made with cal stations in various parts of the country. The ıain of stations now maintained and operated by ıe Radio Corporation of America, the General Electric Company and the Westinghouse Electric nd Manufacturing Company are in New York, Washington, Schenectady, Springfield, Mass., Pittsburgh, Chicago, Hastings, Neb., Denver, Colo. nd Oakland, Calif. Already three short wave ransmitters for the purpose of radio relaying have been established in Pittsburgh; there are two in Schenectady, one in Hastings, one in Springfield, nd one in Cleveland. So much for the physical facts.

What are the implications of a super-power broadcasting system? The fear has been expressed by some that such a system would interfere with the effectiveness and destroy the function of the local station. This is as groundless as would be the belief that a national highway would obviate the need of local roads. The local station will remain the voice of the community which it serves, just as the local newspaper is the expression of its interests.

Moreover, the problem of super-power is no longer an academic question. Super-power broadcasting is here. Already stations in Canada are employing between five and ten kilowatts. A station has been erected in England in the vicinity of London employing 25 kilowatts. A twenty kilowatt station has been established in France, and a number of other countries contemplate the early addition to their broadcasting systems of stations having powers into tens of kilowatts. It has been thoroughly demonstrated that those American stations which have utilized the full one kilowatt permitted by the present regulations have afforded a higher degree of all year round satisfaction to the radio listener than those employing lower powers.

The question now is whether the United States shall lead or follow in the development of super-power broadcasting.

The Radio Corporation of America has every interest to encourage the maintenance of the local stations. The local broadcasting stations operated by the Corporation and its associates stretch from coast to coast and represent the investment of many hundreds of thousands of dollars.

Millions of radio listeners now served effectively by local stations purchase the products of our laboratories, and interference with their local programs would be neither in our own interest nor that of anyone else. In embarking upon super-power broadcasting development we are only following the program already made in radio reception, and purpose to increase rather than diminish the value and usefulness of the receivers in the homes.

PROGRAM VARIETY.

Nor will super-broadcasting give control of the air to any one interest or any one element. Every effort, from whatever direction, to give the country a national service by radio should be encouraged. For I do not believe that the American public will ever accept a single standardized program broadcast in the air. I do not believe that any one agency should or could undertake to tell the American people en masse just what proportion of entertainment or music or news they should receive through the air, to whom they should listen or what they should hear. The air must be kept a free forum, for the public to take what it desires and reject what it will. The primary purpose of the Radio Corporation of America in establishing a system of super-power broadcasting is to create the facilities for a really national service.

And now I come to the part that may be played by a national super-power system in the broadcasting of supreme and permanently organized programs. The problem here is immeasurably greater than that faced by other countries in which broadcasting development has taken place. In England, for instance, 45,000,000 people are packed on an island where the total distance from coast to coast in any direction is barely more than 700 miles. Compare this with our country, where an operatic performance broadcast from New York at 8 o'clock in the evening would be picked up in San Francisco at 5 in the afternoon. Nor would American usage submit to the censorship that prevails in some countries abroad, to the exclusion of political discussion and even to the drawing of religious lines in the air, when broadcasting is done under official control.

No single central program, it is obvious, can adequately meet the requirements of a national broadcasting system in the United States. A super-power broadcasting system, however, would permit the development of a variety of program material originating at central points and relayed by radio or by wire to the furtherest range of usefulness.

THE THREE FACTORS OF THE BROADCAST PROGRAM.

The factors, in my opinion, that will shape the solution of how a permanent broadcasting program is to be organized and paid for are as follows:

1. Truly national broadcasting facilities must first be created and broadcasting transmission as well as reception must be developed to a point where the art will meet every requirement made upon it. The radio industry, the wire communication interests and other elements are now develop-

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ing such facilities.

The permanent operation and maintenance of such facilities are assured by the fact of self interest, if for no other reasons. The radio industry, on its own account, must support the broadcasting facilities it has created if the industry is to survive; the local station will continue in every instance where its establishment is based upon the fundamental fact of community self-expression; and it is not unlikely that other elements will develop revenue-producing methods for radio broadcasting facilities.

2. The radio industry must secure the co-operation of the established elements that have long served our national culture in order that the air may carry the supreme music, education and entertainment of the country.

In other words, I do not believe that the radio and broadcasting interests of the United States should attempt to develop an operatic organization comparable to the one or two national institutions that already exist. I do not believe that it is either practically or economically sound to organize for exclusive use through the air such supreme musical achievements as are now represented in the Philharmonic, The Boston, Philadelphia, San Francisco or other great orchestras. I believe that the great colleges of the country should direct the educational programs broadcast by radio, and that the cooperation of established news organizations should be sought for the broadcasting under suitable conditions of such facts as will heighten the interest in current events fully treated in the newspapers.

3. It should be the self-imposed duty of the radio industry to support financially the distribution upon a national scale not only those elements of the radio program contributed by public and educational interests, but to organize a system of payment for such talent as may be necessary to secure a well-balanced program. The problem, I recognize, may involve a distinction between commercial and non-commercial broadcasting stations, between broadcasters representng the industry and broadcasters representing the community or private interests.

In any event; the suggestions made by Secretary Hoover will have every support from the organization which I have the honor to represent. We come here with an open mind on all subjects which will be under consideration by this Conference. We are willing and ready to contribute to the industry and aid in the solution of the weighty problems so clearly presented by the Secretary of Commerce. The decisions taken here and the work to be accomplished, I trust will go a long way in justifying the principle of "self government in industry" so ably championed by Mr. Hoover.

THE Cape Town broadcasting station was opened on September 15. It transmits on a wavelength of 375 metres, the call sign being WAMG.

Fifty Miles From Nowhere

THEY MET ON THE IRISH COAST—A GOOD PLACE FOR A SHINDY—THESE TWO OLD FRIENDS, AND IT WAS A LIVELY ONE THAT FOLLOWED.

By W. LEE DICKSON.

IN the Dublin railway station, on a certain October afternoon, stood a sandy-haired youth, tall and a trifle too thin. An abraded army coat told his recent activities. From one hand sagged a great, worn bag, bulging and scarred. The other hand held a banjo, its case in disreputable condition. These, with some three pounds, odd shillings, constituted the entire estate, real or personal, of Jerry Martin, American, newest recruit of an important cable company, bound via Farranfore and Cahirciveen for its station on Ballinskellig's Bay, southwest Ireland.

While Jerry waits for the Tralee Express, a brief biographical sketch is pertinent. His father and mother had died when he was a child. His entire legacy was sound health. A garrulous aunt, in Cleveland, in medium circumstances, unwillingly assumed the responsibility of housing and feeding him; scolding him off to school and nagging him to his meals. This lady, with pious resignation, referred to him as "my burden—carrying my poor dead sister's cross for her." He had gone to work at fifteen and contributed to his aunt nearly his total earnings—eight dollars weekly. She accepted it in a casual, belittling manner, although she did not need the money: "But God knows it's only fair he should pay me something after the years and years I've—"

At nineteen, the drabness of office routine and the garrulity of his aunt seemed fixed as eternal things. Then the Great War, remote and unreal in its first years, came close. The war made the break easy—essential.

A wounded leg, long in mending, definitely took him from the insanity of the trenches. But he wanted to stay on with the armies—in Europe—part of this flaming picture. In the hospital a comrade suggested telegraphy, and he seized upon it practicing with a "ticker" and battery mounted on a board.

There was a nurse, an English girl, very young and almost very pretty. She had wheeled him about the grounds. When his leg was very painful, she had stroked his hair with cool fingers and told him not to mind, and called him a hero. In those hours her presence had been peculiarly soothing; and her voice had awakened a strange, new melancholy which, with vague excitements, worked within him —puzzling and poignant. He had called her Jo, as had other adoring casuals.

His discharge from the hospital, and consequent transfer to a branch of the Signal Corps well behind the lines, took place when she was on leave. Awkwardly enough, he had not even left a note for her.

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He served as a telegraph operator until the Armistice, and after. The worn but joyous men chattered madly of going home—*home!* Jerry had no desire to go home. He had climbed from his rut for the war and had discovered the world. He had found it thrilling and colorful sequence of surprises. He had smelled powder and death, seen horrible and beautiful things, and learned to laugh when little cause there was for laughter. And Jo. Home? He could understand it for those with fine and cozy things waiting; but for him; the garrulous aunt, a job.

His request to remain with the Army of Occupation was granted. He continued at the Morse key. There were excursions into the Rhine country, broadening friendships. There were his banjo and numberless ditties. Jerry was popular, with officers and men.

Then the army packed its new wives, its excessive belongings acquired with American dollars, and sailed for home, unit by unit. When the last were ordered home, Jerry Martin worked a discharge, bade lingering farewells to his pals and—went to London. There he played, basking in the joy of his first unbounded freedom. There were sightseeing, theatres, and a wealth of thrills. Sometimes he found himself looking for Jo in the crowds that surged past, and wondering about her, wondering profitlessly. The startingly sudden end of his funds faced him with the necessity of doing something—and at once. Thus it was that he wandered into the cable company. They needed a man for Ireland. That sounded interesting. He signed for twelve pounds a month, wrote his aunt of his new vocation, and proceeded to Dublin.

The ride to Farranfore, in the Tralee Express, was four hours of window-peering. It was very fine and luxurious, at the company's expense. But at Farranfore all luxury was left behind. A branch line, moribund, single-track, held three ancient and dirty wooden coaches which a fussy little engine promised to jerk to Cahirciveen—twelve Irish miles, by cart, from the station.

Jerry and his possessions occupied one of the stiff, wooden seats in a third-class car. A few peasants, sullen and not too clean, were his companions. The fine express glided on. Jerry's train lurched, groaned and bumped the beginning of its tortuous four-hour journey. The creaking cars snailed past villages and into the barren country of low hills. After three hours, the depression of southwest Ireland's unfertile desolation began to damp those spirits so recently kindled in London. Jerry turned to an unshaved farmer. "Is it all like this, down here?" he asked.

"Like what?"

"Why—like this: you know—bare—" He stopped, fearful of antagonizing a native son. He had learned this caution in France, in Germany, and in England.

"Where're ye goin'?" the Celt queried.

"To the cable station on Ballinskellig's Bay," Jerry told him.

The farmer snorted. "The cable station, is it?" Never been there?"

"Never."

He snorted again, and spat outrageously in the aisle. "Well, if ye'll be callin' this 'bare,' wait till ye see that Ballinskellig's Bay country. Of all the God-forsaken places—it's, as they say, fifty miles from nowhere. 'Tis then so!"

"Where the blind, white sea-snakes crawl" crawl the cables. From man's earth, through the ooze and over the mountains of the ocean's bottom, through eternal blackness of the sea-world, to man's earth again—untiring, cold, mysterious, without sound or motion—they bear his manifold messages.

Twelve miles from Cahirciveen one turns to the right, to the shore of Ballinskellig's Bay, and to the cable station. A few hundred yards from and facing the bay is the office—a large rectangular building which houses the operating-room, with its orderly array of sending and receiving machines; the terminals for Morse lines to England; a mechanicians' shop and battery room. The cables never rest. There are ninety operators—thirty men for each eight hours of every day—supervisors and mechanics, ever watchful, ever busy.

To the right of this building are the "married men's houses"—squat little dwellings furnished by the company. Farther on is the mess-hall for single men, and then their quarters—a building of small rooms and meager furnishings. Adjoining this, the superintendent's ("Old Man's") house. Inland of these buildings is an open field for sports—cherished recreations of the men. On three sides of this lonely group are bogs, backed by bleak, heather-covered hills. Gray desolation, unchanging, barren, cheerless as the bay itself: a treacherous water beyond low shingle cliffs, condemned by Lloyd's for all shipping.

The buildings were damp and chilly from the all-too-common downpour that beat its familiar tattoo on the roofs. In the mess-hall, smoke-filled and humid, the off-duty men cursed the weather, played cards, and exchanged colorful rumors of the Republican insurgents taking the unguarded station as a blow at the new Free State. The operators were largely British and Scotch. They discussed the Republican-Free State ferment in a detached and cautious manner with their Irish comrades. There was no gasconading here. There were rumors—that was all; and the chief concern of the men was what danger the situation held for them personally—or what welcome excitement.

An ancient and toneless piano was being tortured into an abortive rendition of "My Old Dutch." A few of the vocally inclined were adding to its din. Lonely men, working hard to forget their loneliness.

Near a window sat Napoleon (on the company's books, however, as Harry Sykes). Napoleon; and the little cockney's anomalous appellation pleased him no end. Lacking any clear conception of the history or manner of the illustrious one whose name

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he bore, he nevertheless endeavored to give cause for the continuance of the honor by cultivating a lock of red hair to hang over his forehead, and by thrusting one hand under his coat and over his heart, when speaking. In this he had been coached and encouraged by a devoted roommate whose highest praise was: "Blimy! when ya stahnd that wye, yer 'air over yer tem-pul, an' yer 'and over yer 'eart, Napolyun's aown mother wouldn't know ya apart, or I'm a blinkin' bew-gler!" Whereupon Napoleon would reply: "Aw yer fyce is full o' talk!" But he always added, hopefully: "Hi don't now—word of honor, do I?"

In customary attitude he sat, beguiling the time by casting good-natured insults in the direction of the piano, to the joy of all within earshot. "Hi never before knew that deafness was a blessin'! 'Ow's the chawnces of 'avin some mew-sic in plyce of that noise barrage?" And so on. Suddenly he turned to the window, pressed his face against the steaming pane and then rose with a cry. "Lads! Hit's the new un! 'E's come all the wye from Cahirciveen in the ryne! Ouch! Wot's that? Bless me 'eart, look! 'E's got a fiddle or a bahnjo!"

They opened the door and peered out. In the downpour and mud stood a "jaunty"—the little side-seated Irish cart that serves all travelers on the road from Cahirciveen. Horse, driver, passenger and luggage were drenched. Jerry paid the fare, turned, and trudged into the smoky light of the waiting room. Rain dripped from his chin, his ears, his hands. He blinked and grinned through his confusion, shook himself, dog-like, and dropped the bag and banjo on the floor. Napoleon was the first to grasp his surprised hand. "Welcome to the station, lad! M' nyme's Sykes—but just call me Napolyun. Wot's yours?"

Jerry told them; and the telling disclosed his nationality, confirmed by the coat he wore. "He's a Yank!" some one called; and the designation clung.

Where, as at this station, a small company of men are by virtue of their work insulated from the world, the departure of an old member is second only in importance to the arrival of a new. In the former case, the loss—or gain, if he was disliked—is a known quantity. In the latter, the interest is highly flavored by the uncertainty of the newcomer's qualities. Will he be a grouch? Will he be lazy, or help in the sports? Married or single? Great speculation and swift appraisal attend his first moments among them. But if—*if* he plays a banjo, we'll say, this is his ticket to immediate popularity. Other things can wait. If he can play and sing to them, cause enough to be glad of his coming. And the men are seldom wrong in the light of later analysis; for it seems that those who play and sing to their lonely leisure prove equally good companions in work.

Jerry, then, was accepted: first, on his banjo; second, on the honest smile that accompanied all his replies to their eager questionings. He was taken to the quarters adjoining, to a room—his room—and they helped him into dry clothes. Then a group headed by Napoleon, who carried the precious instrument, escorted him back to the mess-hall, where the little cockney announced: "Lads! Our new friend, Mr. Yank Mahtin, 'as koindly consented to ply and sing a few of 's nytive ditties. Hintroducin' Mr. Yank Mahtin formerly of the U-nited Stytes Harmy, an' now of this stytion, God 'elp 'im!"

There were cheers and a din of pounding and clapping. Jerry, inured to such audiences in the army, and knowing the futility of declining, perched grinning on a table, tuning up. The men bent forward, silent, hopeful. So still they were that the light, opening chords had a steady, muffled bass in the rain that beat unceasingly without. Then Jerry sang, easily, confidently, pleasingly, a "mammy" song of Broadway, three years old.

(To Be Continued.)

Death of P. B. Delany

PATRICK BERNARD DELANY, inventor and for fifty years a friend and associate of Thomas A. Edison, died on October 19th at his home, 167 Scotland Road, South Orange, N. J., not far from the Edison home, at the age of eighty years. He succumbed to a heart attack, having been ill ten days. The funeral services, which Mr. Edison attended were held on October 22nd, at the Roman Catholic Church of Our Lady of Sorrow, in South Orange. Burial was at Nantucket, Mass.

The inventor of 200 major devices, Mr. Delany was a member of the Institute of Electrical Engineers, of which he was at one time vice-president, and of the Franklin Institute. He was born in Ireland and came here in his youth, learning telegraphy at Hartford. Later he became a newspaper man, interested chiefly in the mechanical processes.

His inventions include the anti-induction cable, synchronous multiplex telegraphy, a method of transmitting six messages simultaneously on one wire, the vox humana talking machine and automatic systems for ocean cables. He won the Elliott Cresson gold medal twice, the John Scott legacy medal and gold medals at the Buffalo Exposition of 1901 and the St. Louis Exposition of 1904.

One of his inventions, a detector of precious metals, resulted in the location and recovery of $30,000,000 in gold and silver from the sunken liner Laurentic off the coast of Ireland recently. This device was used again last year by a wrecking company in New York Bay to recover $300,000 worth of copper ingots.

Mr. Delany divided his time in recent years between the Oranges and his estate in Nantucket, where he maintained a large and specially equipped laboratory. He is survived by a son, James Henry Delany.

BOYS WITH WHEELS OVER 16 YEARS OLD. Apply Western Union.

Now I *know*!

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J. Frank Howell

THE following story is told by Elbert Hubbard who was lost on the Lusitania at the beginning of the war:

While rubbering around Wall Street, I bumped into my old friend, J. Frank Howell.

Here is a man I knew in Illinois thirty-five years ago. I remember him for just one thing, and that was that he was a station-agent and sold me a ticket to Chicago on time. He had no business to do this, but he did it just the same.

Railroads do not sell transportation to unknown parties on time; however, Frank Howell chanced me, and put up the money out of his own pocket. The other day when I accused him of breaking company rules he denied the whole transaction.

I lost track of Frank Howell for twenty years, and was then reintroduced to him by Uncle George Daniels in the year Nineteen Hundred. Uncle George, William Jennings Bryan, J. Frank Howell, Frank A. Vanderlip, Melville Mix, John R. Thompson and I all have something in common. We were born in Illinois within a day's horseback ride of one another; took our bumps and rode the bumpers when we could not get trusted for a ticket to Chicago.

Illinois has a wonderful soil—she produces something besides corn and hogs, and the fact that I was born in Illinois I trust does not incapacitate me from making a few remarks on the Illini.

The men of the Middle West are playing big parts in the financial world. I am told there is one great businessman in New York who was born there, but I have never been able to get his name and address.

Wall Street is not made up of sharks, ogres, or loud flashy parties who talk big and sport shiners. The typical Wall Street man is self-contained, modest, gentlemanly, sympathetic. When he doesn't know what to say he doesn't say it, and when he doesn't know what to do he doesn't do it. When in doubt he reads the Essay on Silence, memorizing a few choice selections and repeating them to himself.

No State in the Union has produced so many men of financial genius and executive ability as Illinois. Just let me name these: Sir William Van Horne, Charles Melville Hays, George W. Perkins, Frank A. Vanderlip, George H. Daniels, Theodore N. Shonts, and Elbert H. Gary. George M. Reynolds was born in Iowa, but did not blossom until he came to the Succor State.

Frederick D. Underwood and Sir Thomas Shaughnessy are Wisconsin products, but got a little of the Illinois mud on their brogans before they bloomed into sure-enoughs.

All these men I have named were graduates of the University of Hardknocks. They were born of poor parents and were brought up to keep the woodbox full, to shovel snow, to clean up the front yard in the Spring, to make garden, bring in the eggs, milk the cow, break the colt. They hunted rabbits in the Winter, fished for bullheads in the Spring, went swimming, played hooky occasionally, carried cobs from a Brown cornsheller, forked sheaves into a Case thresher, drove a team when the new railroad was built, jackassed freight at the railroad station, clerked in the post-office, worked in the general store, and generally made themselves useful.

The fare was plain, sometimes the work was hard, the weather was accepted as a matter of course; but the spelling-bee and revival meetings supplied diversion.

These boys brought up to face complications are the men who make executives. They assume responsibilities, shoulder emergencies, accept life and find it good. J. Frank Howell was reared to do all of the farm-work which farmers' boys are supposed to do. Very naturally he put in a certain amount of time around the railroad-station, as this was the place of excitement.

He helped the agent shake down the stove, made a bluff at sweeping out, delivered telegraph-messages, learned to operate the key.

When the old telegraph-instrument was discarded, the agent sold the old outfit to Frank, who took it home and rigged up a line of his own.

Naturally there came a time when the station-agent wanted to take a vacation—a day off, and Frank Howell took his place.

He learned to send and receive. He knew the lingo of railroading, got acquainted with the trainmen, jumped the engine, and got a nod of recognition from the superintendent when he came through in his private car.

He went on as night operator at the next town; then he got the day shift and was agent at Homer, where Number One didn't stop. Went to Morrisonville, took a try as sub at the big town of Taylorville, Joe Cannon's town.

The wanderlust was upon him.

He deadheaded to Chicago and saw his first bill-of-fare at a restaurant, and not being able to make it out ordered ham and eggs, just as we all have done.

He got on a street-car, paid five cents and rode all day, or until he was forcibly ejected by the conductor.

When he went out on the street he stuck to the one avenue and inwardly blazed the trail so as to know his way back, ventured six squares from the boarding-house and got home intact. Every man he met he thought was a confidence-man but no confidence-man took him in, perhaps for the reason that he did not have anything the confidence-man wanted.

He went back to the key, became assistant despatcher, went to the President's office in Grand Rapids and later to Milwaukee to take a job handling commercial and press matter, learned to correct reporters' copy, got a little insight into the newspaper life, was shifted to New York, where later he took a private wire in a broker's office, where he not only took care of the wire but learned to run the broker's business.

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Everybody gravitates to where he belongs. Power goes to those who can shoulder it, and responsibility is the possession of those who can get under the burden.

The reward for work is more work and harder work.

For twenty-six years J. Frank Howell has been a broker in Wall Street. His business has been simply to take orders and fill them. He is one of the Governors of the Consolidated Stock Exchange. Thirteen years ago when Uncle George Daniels bumped me into Howell, Uncle George said, "Howell is one of the men who can carry a message to Garcia." At another time Uncle George said to me, "If I had a hundred thousand dollars in gold and wanted a man to carry this to England and invest it there for me, I would put it in the hands of J. Frank Howell, and I wouldn't burden him with direction or orders about what to do."

Howell has physical health, patience and a good-cheer that never languishes.

He is active, earnest, is a good listener, and anything he says is accepted at par. His word goes net, not gross. He is a man in whom other men believe.

Not a big financial man in New York City or London but that would accept the word of J. Frank Howell without quibble or question on any theme.

He is trusted with millions without a bond, or without a scrap of paper. He does not buy and sell on his own account. He works for others.

He makes money—not a vast quantity, however, as the margins in Wall Street are very close. Think of doing business on one-quarter of one per cent. and making money.

When Lincoln was elected President of the United States we had thirty-three millions of people in America—now we have a hundred millions. The average wealth per capita in America today is twelve hundred dollars, this for every man, woman and child. In Eighteen Hundred Sixty-five the per capita wealth was less than four hundred dollars.

The railroads have been our greatest factor in wealth-producing. J. Frank Howell is a trained railroadman. He knows the game from grading with a mule team to swinging a sledge driving spikes, manipulating the telegraph key, running the trains, taking care of terminals, and furnishing the sinews of war that make railroad-building possible.

When you hear the slanders and libels heaped by the muckrackers upon the business fabric of America, and especially upon railroadmen, just take the thing sixty-five, ten and five off.

There have been selfish men in the railroad business, but on the other hand the majority of railroadmen of the first class have come up from the ranks, and have been promoted only because they rendered the public a service.

They are farmers' boys, brought up to face difficulty, trial, hardship, who know the economies of life. They have felt the pinch of poverty; they are not easily disappointed; they ask for little, and out of life's scrimmage they emerge victorious. Of course, they never get out of life alive, but they have added to the wealth of the world, and to this wealth we are all heirs. In order to get some of this wealth that the world owns, you have only to confer on society a benefit.

Get at it, do something, be somebody, keep your bazzaza closed a part of the time. Keep your word, get eight hours' sleep, do not overeat, cut out the booze, and don't monkey with the pasteboards.

Tartartic Acid Crystals

By Wix

Sitting in my room on a cold, rainy day a short time ago, undecided whether or not I should read Shakespeare, Euclid, Goethe, Nomer or Aesop's Fables, I finally decided on something of a lighter vein and picked up a volume of an encyclopedia.

Among the many articles that interested me was the short description of Tartaric acid crystals stating that "when gently warmed they become strongly electric." I am submitting this for those of your readers interested in wireless who may want to experiment on these crystals as a possible substitute or aid for the usual mineral crystals or to be used in connection with them by placing the ordinary metal crystal on top of the Tartaric acid crystals.

With a set thus equipped one may possibly be able to "pick up" a station located as far distant as Kinnikinnick, Ohio, is from Chicago or New York.

Should the experimenter be economically inclined and finds that the idea may not work he can save the few cents expended for the Tartaric acid crystals by placing them in a glass of water to which a teaspoonful of sugar has been added and have a nice glass of lemonade. While contently sipping his lemonade he can decide what business a telegraph operator has in reading Shakespeare. Yet Shakespeare wrote a poem on the "Seven ages of man" that could be transposed into "seven ages of a ham" by present day operators if they will recollect the various stages they went through in becoming fairly proficient and in finally learning that they do not know nearly as much about their work as they "thought" they knew about it in the earlier periods of their career.

Captain Eckersley, the radio engineer of the British Broadcasting Company, has left London for the United States and Canada to see what arrangements can be made with regard to linking up the two continents by broadcasting. He is also going to see what different methods of broadcasting are in use in the United States and Canada, and will compare English methods with ours.

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American Telephone and Telegraph Company

New York, October 15, 1924.

TO THE STOCKHOLDERS:

Since you received your last dividend check the recent stock issue of your company has come to a successful close. The stock, offered at par to the Company's 316,046 stockholders of record at the close of business June 10, 1924, at the rate of one share for each five shares held, amounted to $151,157,500 at par. This, we believe, is the largest transaction of the kind ever undertaken.

There were slightly more than 193,000 subscriptions, averaging 7.7 shares each. Of these, 140,000 were paid for in full and 53,000 were made on the deferred payment basis.

Nearly 175,000 of the subscriptions were made by former stockholders and over 18,000 by investors who, by the purchase of rights, acquired the right to subscribe.

Everything practicable was done to inform the stockholders of their rights and of their value, but, notwithstanding this, as has always been the case, a small percentage of the stockholders failed either to exercise their rights or to sell them. The amount of stock remaining unsubscribed is slightly over 1%. This unsubscribed stock may be sold at any time at the market price.

Since June 10, 1924, as a result of the purchase by the public of rights and of stock in the market at the market price, more than 24,000 new stockholders have been added, and the total number is now over 340,000.

Below is a statement of the earnings of the Company for the first nine months of this year, as compared with the first nine months of last year.

H. B. THAYER, *President.*

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
EARNINGS REPORT

	9 Months Ending September 30, 1923	9 Months Ending September 30, 1924
Earnings:		
Dividends	$39,890,945.02	$45,091,017.37
Interest	9,408,273.51	10,720,753.64
Telephone Operating Revenues	53,379,023.57	55,370,205.07
Miscellaneous Revenues	277,509,04	323,384.45
Total	$102,955,751.14	$111,505,360.53
Expenses Including Taxes	31,952,270.57	34,349,586.72
Net Earnings	$71,003,480.57	$77,155,773.81
Deduct Interest	9,747,338.43	12,444,093.40
Balance	$61,256,142.14	$64,711,680.41
Deduct Dividends	46,770,738.60	51,962,373.51
Balance	$14,485,403.54	$12,749,306.90

C. A. HEISS, *Comptroller.*

Broadcast Receiving Sets on Board Ship

UNDER the Wireless Telegraphy Act, 1904, the Postmaster-General's authority is necessary before any wireless apparatus is installed or worked on board a British ship.

Licenses to use wireless apparatus for the reception of broadcast programmes on British ships can now be issued.

Individual licenses in the name of each passenger or member of the crew will not be necessary. One such license will suffice for each ship, and any shipowner desiring such a license should apply to the Secretary, General Post Office, London, E. C. 1, giving the name of the ship concerned.

In the case of ships equipped with commercial wireless installations the following special conditions are imposed in addition to the conditions printed on the license.

(1) The use of a ship's main aerial for the reception of broadcast programmes is prohibited except when the ship is in port.

(2) The broadcast receiving apparatus and aerial must not be connected in any way with the ship's main wireless installation.

(3) The broadcast receiving apparatus must not be worked by the ship's wireless operator during his hours of watch.

(4) Persons using the broadcast receiving apparatus must sign the usual declaration of secrecy if by such use they become able to intercept private telegrams to and from the ship.

Ships wireless operators have instructions to report to the master any interference with a ship's main wireless installation caused by a broadcast receiver on board, and it is, of course, within the competence of the master to prohibit the use of wireless apparatus by passengers or crew if he thinks it desirable to do so.

The Telegraph and Telephone Life Insurance Association Secures Exclusive Services of Thomas E. Fleming

THE Telegraph and Telephone Life Insurance Association, with offices at 195 Broadway, New York, will hereafter have as its managing head Thomas E. Fleming, with the title of Vice-President and Secretary.

President Thomas W. Carroll, in announcing that Mr. Fleming will take on the management of the Association's business, states that Mr. Fleming has been active in the Association's work since the year 1888; as secretary from 1888 to 1897; on its auditing Board from 1898 until 1913, in which latter year he was elected a member of the Executive Committee. In 1917 he was elected vice-president.

N. M. Giffen, who has served as secretary of the Association since 1918, has resigned to enter the service of the Western Union Telegraph Company.

Mr. Fleming is one of the most widely known telegraph officials in the United States. As secretary of the Old Time Telegraphers' and Historical Association he has greatly broadened the activities and scope of this growing telegraph organization, and his host of friends throughout the United States and Canada will be glad to learn that the Telegraph and Telephone Life Insurance Association is to be carried along to greater usefulness and service by his genius for organization and promotion.

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EDITORIAL COMMENT

Self-Governing Radio

A FINE example of industrial self-government is afforded by the young but constantly growing radio industry. The only enacted laws which give authority to the Department of Commerce for the control of radio are those passed in 1912, long before broadcasting was a commercial possibility.

The great growth of radio has occurred during the administration of Secretary Hoover, who as an engineer and administrator of exceptional experience has preferred to handle the constantly increasing difficulties of radio with the co-operation of the industry itself. In a degree this attitude has been forced upon him, because in 1922 and 1923 Congressman White, of Maine, endeavored to have radio regulatory laws passed by Congress, but in each instance failed.

At Secretary Hoover's request the recent Third National Radio Conference was held in Washington. Over 300 representatives from all divisions of the radio industry came to Washington at the Secretary's request, paid their own expenses and devoted a week of their time to a finely co-ordinated effort to assist him in framing measures under which the radio industry in its many ramifications can be controlled for the benefit and common good of all who are interested in it.

Both President Coolidge and Secretary Hoover have repeatedly declared that the air shall remain free of any monopoly. This policy doubtless will be carried out with the co-operation and by means of the good common sense already exhibited by the representatives of the industry. It may be that later on Congress will be compelled to pass radio laws, but up to date and since 1912 the radio industry seems to have been quite capable of self-government.

Radio in Hospitals

ONE of the most beneficent fields of usefulness of radio is the reception of radio broadcasting in hospitals. Besides the benefit to patients through providing entertainment, medical authorities testify to the actual therapeutic value of the mental relief thus afforded. The Bureau of Standards is assisting in the technical phases of current movements to equip many thousands of hospital beds with radio service. Since the middle of March of this year there has been a popular campaign directed from one of the large broadcasting stations which has raised funds for the installation of radio in the United States military service hospitals. A technical committee of Government experts (representing the Signal Corps, Navy Department, and Bureau of Standards) is furnishing technical advice as to the material and method of installation for these hospitals. The first hospitals equipped were Walter Reed General Army Hospital, Naval Hospital, and Mount Alto Veterans' Bureau Hospital, all located in Washington, D. C.

The general system employed is to use one receiving set and a powerful amplifier to supply the entire hospital, each patient being supplied with head telephone receivers which can be connected or disconnected at will. The amplifier used is capable of supplying about 3,000 head sets in parallel, and by reducing the number of head sets and using suitable transformers a number of loud speakers may also be used in the various rooms. At Walter Reed Hospital 1,500 head sets and six loud speakers are used, the loud speakers being provided for assembly halls only. This equipment requires the services of one man continuously while the set is in operation, to control the volume of sound delivered to the patients. The set used is capable of receiving distant as well as local programs, but because of disturbances that may be introduced in distant reception local programs are used except on special occasions where a program of very general interest is being broadcast from a distant station. The installation includes a microphone which is used for the distribution to the patients of programs given in the auditorium or elsewhere in the hospital. This microphone makes it possible for any person to address all the patients of the hospital simultaneously. The installation has been in operation for four months and has been very satisfactory.

The work of equipping other hospitals is being continued, and the material for all service hospitals in the vicinity of New York City has been ordered. The aim of the movement is to make it possible for every patient in all the military hospitals of the United States to listen to radio programs. A large part of the money for this purpose has been raised, and the campaigns are being continued. Similar campaigns for the equipping of non-Government hospitals in various places have been begun.

Old Time Telegraphers

DEAR MR. TALTAVALL:—

I read with interest the letter of C. S. Rindfleisch regarding a home for aged or "Old Time Telegraphers." It seemed to me a good idea, and I write to request that you as the foremost exponent of the craft take the matter up and see what you can do. I for one would be pleased to make a small contribution and agree to a small annual appropriation.

I feel sure that there are many others who would be pleased to do as much or more than I can.

Very sincerely yours,

WM. S. BREWER,
78 Watts Street,
New York.

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Hawkin's Electrical Guide contains ten wonderfully helpful and practical volumes, written in clear, concise language, easy to understand, no wasted words, full up-to-the-minute electrical knowledge, which can be applied to problems that come up from day to day. You can carry a number of the books with you until you have mastered the subjects. All subjects are indexed so that you can find the information instantly. Written in the modern question and answer form. It's like having an electrical authority always at your elbow ready to answer any question you ask. 4700 pictures, 3500 pages, pocket size, flexible cover; price $10.00 for the full set of ten books. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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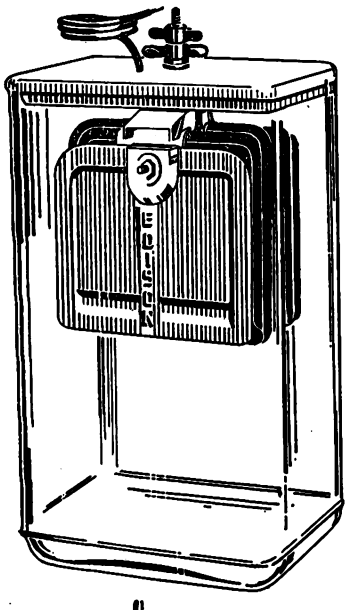
FOR
TELEGRAPH AND TELEPHONE



EDISON PRIMARY BATTERIES
for Telephone Service

There undoubtedly is a very good reason why such representative railroads as the Pennsylvania System, the New York Central Lines, the Lackawanna and others are using so many Edison Primary Cells on dispatcher's transmitters, and in other classes of telephone service.

We shall be glad of the opportunity to demonstrate to anyone interested why they have found them so satisfactory and economical.

Thomas A Edison, Inc.
EDISON SIGNAL BATTERIES-PRIMARY and STORAGE
BLOOMFIELD - NEW JERSEY

ST. LOUIS
Railway Exchange Bldg.

CHICAGO
Peoples Gas Bldg.

SAN FRANCISCO
Balboa Bldg.

2030-36

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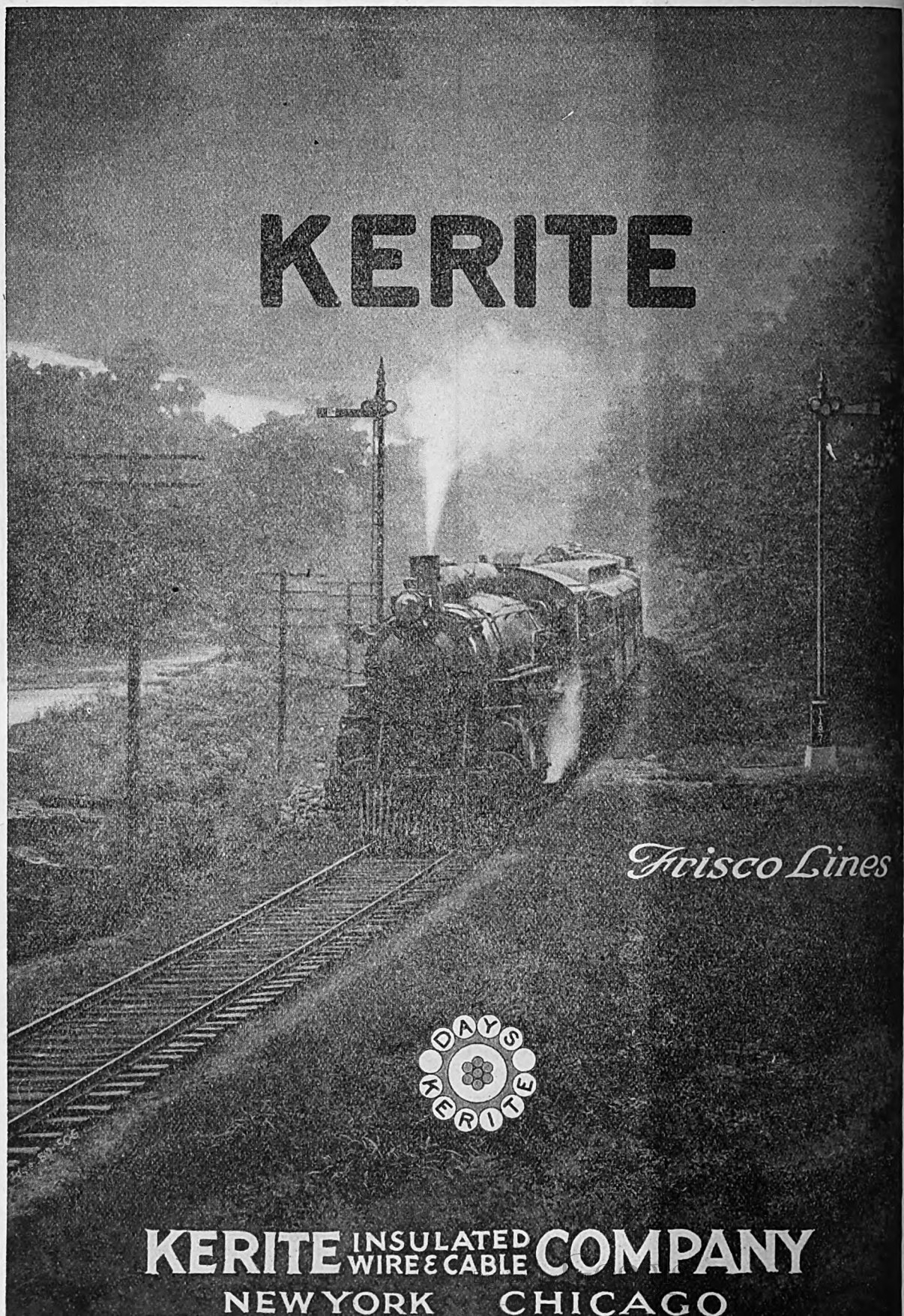

KERITE
Frisco Lines
DAYS
KERITE
KERITE INSULATED WIRE & CABLE COMPANY
NEW YORK CHICAGO

New York Telegraphers' Aid Society

THE Forty-fourth Annual Entertainment and ception of the New York Telegraphers Aid Soty in behalf of the Relief Fund, will take place Terrace Garden, 58th Street, between Lexington d 3rd Avenues, Manhattan, on Friday evening ovember 21st.

The net proceeds of these entertainments is deted exclusively to those of the fraternity who ay be in distress and who for any reason may be eligible for membership in the Society.

Since the date of the organization forty-four ears ago, they have maintained and conducted is most worthy charity, and thereby afforded a roper burial place for those who otherwise would ave become a public charge.

Admission, 50 cents . Reserved seats, 75 cents. ox seats, $1.00. Tickets for sale at Telegraph nd Telephone Life Insurance Association, Room 01, 195 Broadway, and Room 1229, 24 Walker treet, Manhattan.

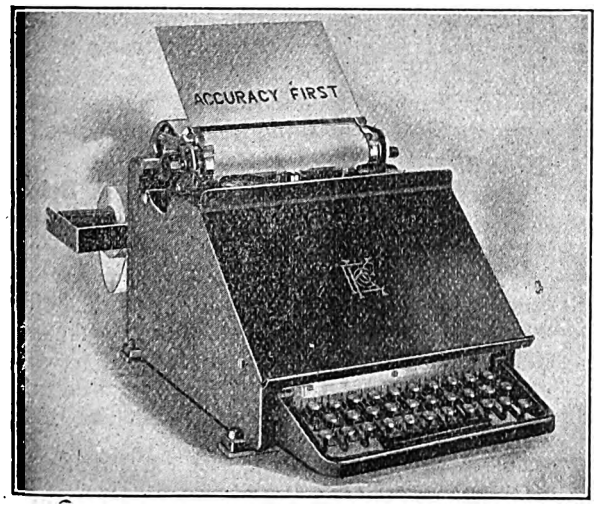
Remittances should be made to C. A. Kilfoyle, Financial Secretary, P. O. Box 711, City Hall Station, or Wm. J. Quinn, Room 1229, 24 Walker St., New York.

ENTERTAINMENT COMMITTEE.

W. J. Quinn, Serial Building Loan and Savings Institution, 24 Walker Street; P. J. Tierney, Western Union Telegraph Co., 40 Broad Street; F. A. Fettibaldi, Western Union Telegraph Co., 1450 Broadway; N. M. Giffen, Telegraph and Telephone Life Ins. Assn., 195 Broadway; J. N. Kelley, Western Union Telegraph Co., 24 Walker Street; C. S. Pike, Western Union Telegraph Co., 24 Walker Street; E. P. Tully, Postal Telegraph Cable Co., 253 Broadway; F. J. Nurnberg, Western Union Telegraph Co., 195 Broadway; A. M. Lewis, Western Union Telegraph Co., 24 Walker Street; C. D. Reed, Erie Railroad Co., Terminal Building; W. W. Price, New York Stock Exchange, Broad Street; J. F. E. Hopkins, Western Union Telegraph Co., 24 Walker Street; J. Roe, Long Island Railroad Co., Jamaica; J. F. Nathan, Western Union Telegraph Co., 195 Broadway; H. Zweifel, Postal Telegraph Cable Co., 26 Cedar Street; J. H. Driscoll, Western Union Telegraph Co., 313 Fulton Street; F. J. Sherry, French Telegraph and Cable Co., 25 Broad Street; G. E. Palmer, Western Union Telegraph Co., 195 Broadway; J. B. Taltavall, Telegraph and Telephone Age, 253 Broadway; A. C. Ackerman, Postal Telegraph Cable Co., Jersey City; A. A. McNeill, Western Union Telegraph Co., 195 Broadway; N. J. Crean, Savin & Co., 66 Broadway; J. A. Berry, Western Union Telegraph Co., 24 Walker Street; F. J. Sheridan, Western Union Telegraph Co., 24 Walker Street; J. J. Kihm, New York Stock Exchange, Broad Street; F. L. Catlin, J. Frank Howell, 15 Whitehall Street.

R. J. Marrin, Chairman, 415-5th St., Brooklyn, W. Redlefsen, Vice-Chairman, Postal Telegraph Cable Co., 253 Broadway; J. P. Clolery, Vice-Chairman, Western Union Telegraph Co., 24 Walker Street.

EVERY USER IS A KLEINSCHMIDT BOOSTER



ONE CUSTOMER WRITES:

We are having little or no trouble with our machines. One man is taking care of twenty Telegraph Typewriters and he devotes part of his time to other matters.

ANOTHER WRITES:

We wish to advise you that your Telegraph Typewriters are working fine and doing everything you guaranteed them to do. We find the system one for efficiency and an asset to our working organization.

A THIRD WRITES:

Both machines gave excellent service and had hard usage as the test work is sometimes rougher than regular work on good lines.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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POSTAL TELEGRAPH-CABLE CO.

EDWARD REYNOLDS, vice-president and general manager, delivered a talk before the Exchange Club at a luncheon held at the Hotel McAlpin, New York City, on October 23rd.

William C. Daviet, vice-president, is making an inspection trip to offices in New England.

Eugene P. Tully, vice-president, is on an extended inspection trip of offices in the Western and Pacific Divisions.

Howard Graham, of Vice-President and General Manager Reynold's office, together with Robert F. Wittgens, of the auditing department, spent two weeks at Cold Spring Harbor, Long Island.

A. F. Connery, of J. P. O'Donohue's office, is away on vacation.

D. Zabriskie, chief draughtsman, in the plant and engineering department, is at home due to illness. His office associates hope for his speedy recovery.

The fall dinner of the Magnetic Club will be held in the North and East Ball Rooms of the Hotel Astor, New York, on November 15th.

THE final and deciding game of base ball between teams composed of employees of the Postal Telegraph Company and the Commercial Cable Company, resulted in a victory for the Postal team, by the score of 8 to 3.

Much interest was manifested in these games and it has been decided that next spring teams will again be organized and a series of games will be arranged for.

New York City

WIRE CHIEF GEORGE MITCHELL has been transformed from the day tour to early nights.

Bill Wolff, operator on the Washington circuit, is reported doing well after an operation from appendicitis.

Among the recent visitors were: Manager McGuire of the Pittston, Penna. office, and Miss Farrell, Superintendent of Continuation Schools of Brooklyn, N. Y.

The bowling team will shortly begin practicing, and will issue a challenge for a return match with the Chicago's in an effort to erase the defeat which Chicago administered last season. The following officers were elected: V. Fiore, president, James Russo, treasurer.

Anna Church, operator at 253 Broadway several years ago, recently visited her friends, and reported that she is much better in health.

Miriam Coffey, multiplex operator was an interested spectator at the annual foot ball game between the Middies of the United States Navy, and Princeton. Miriam rooted for the middies, for it was rumored that "He" took part in the game. Too bad the middies lost.

S. Sorenson has been transferred from the early night force to an all night tour in charge of the Service Department.

The Printer Department will shortly open a school for attendants. The Morse quadruplex men, and wire chiefs have been invited to avail themselves of the opportunity to acquaint themselves with operation of the machines.

New Mackay Cable Via Azores to Link America and Germany

As part of the international efforts being made to rehabilitate Germany, Clarence Mackay, president of the Commercial Cable Company, announced on October 16th that he had completed arrangements with Dr. George Solmssen, president of the board of the Deutsche-Atlantische Telegraphen Gesellschaft, for the laying of a cable between Germany and the United States.

Mr. Mackay returned on the Cunard liner Mauretania from a short trip to Europe. Concerning the laying of the cable he said:

"There has been some delay, owing to the necessity of obtaining landing rights at the Azores for the Germans, but these have been obtained, and immediate steps will be taken for the manufacture and laying of the cable. The cable from New York to the Azores will belong to the Commercial Cable Company, and the cable from the Azores to Germany will belong to the Deutsche-Atlantische Telegraphen Gesellschaft, but they will be connected at the Azores automatically, thus making a continuous circuit from New York to Germany.

"The cable will be of the latest design, capable of the highest speed. The German government has given the Deutsche-Atlantische Telegraphen Gesellschaft, which owned cables between Germany and the United States before the war, the right to lay this first cable to Germany, and no other company has been given similar rights because naturally the German government wishes to assist the old German company to rehabilitate itself in view of having lost everything in the war.

"The Commercial Cable Company has the only contract with the Deutsche-Atlantische Telegraphen Gesellschaft for the exchange of traffic to and from the company.

Mr. Mackay commented on the success of the German loan as marking the turning point in European affairs.

Woman Telegraph Manager A Bride

MISS LILLIAN M. PIERCE, manager of the office at Manchester, N. H., left this place recently for her home in Framingham, Mass. where she was married to Clarence G. Hamilton of that city. Mr. Hamilton is connected with the Amoskeag Manufacturing company. He was in the naval service during the war and went across several times. Formerly he was a sign painter for the Boston and Maine railroad.

Miss Pierce was graduated from the Massachusetts Radio and Telegraph school of Boston at the conclusion of her public school work. She was afterward for a time a telegraph operator at Framingham where her parents, Mr. and Mrs. Nelson H. Pierce, make their home, and has been the Manchester manager for a year.

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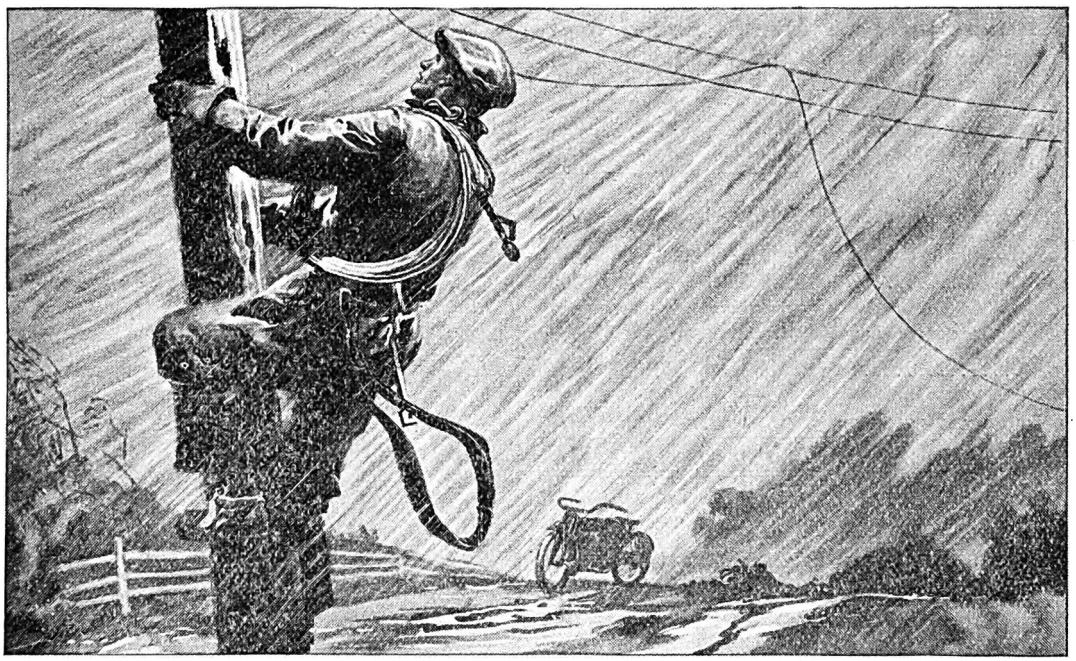

Keeping the Telephone Alive

Americans have learned to depend on the telephone, in fair weather or in foul, for the usual affairs of the day or for the dire emergency in the dead of night. Its continuous service is taken as a matter of course.

The marvel of it is that the millions of thread-like wires are kept alive and ready to vibrate at one's slightest breath. A few drops of water in a cable, a faulty connection in the wire maze of a switchboard, a violent sleet, rain or wind storm or the mere falling of a branch will often jeopardize the service.

Every channel for the speech currents must be kept electrically intact. The task is as endless as housekeeping. Inspection of apparatus, equipment and all parts of the plant is going on all the time. Wire chiefs at "test boards" locate trouble on the wires though miles away. Repairmen, the "trouble hunters," are at work constantly wherever they are needed in city streets, country roads or in the seldom-trodden trails of the wilderness.

Providing telephone service for this great nation is a huge undertaking. To keep this vast mechanism always electrically alive and dependable is the unending task of tens of thousands of skillful men and women in every state in the Union.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

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THE WESTERN UNION TELEGRAPH CO.

NEWCOMB CARLTON, president of the company, who was injured two weeks ago by a taxi, has so far recovered as to enable him to visit his office, which he did on October 21st and 22nd.

Earnings Report for Nine Months Ended September 30th, 1923 and 1924

(Month of September, 1924, Estimated)

	1924	1923
Gross Revenues, including Dividends and Interest....	$84,383,219.00	$84,719,297.00
Maintenance: Repairs and Reserved for Depreciation...	$14,259,056.00	$13,592,663.00
Other Operating Expenses, including Rent of Leased Lines and Taxes.....	58,922,570.00	59,276,399.00
Total Expenses	$73,181,626.00	$72,869,062.00
Balance	$11,201,593.00	$11,850,235.00
Deduct Interest on Bonded Debt	1,734,075.00	1,731,392,00
Net Income	$9,467,518.00	$10,118,843.00

E. Y. GALLAHER,
Vice-Pres't and Compt.

Edward C. Gibbons, an engineer of this office, has been in the city of Mexico for the past two weeks looking over the Mexican telegraph lines and equipment.

MANAGER SHEPARD, of Valdosta, Ga., has returned from Atlanta, Ga., where he attended a conference of fifty representatives of the company from Georgia and Alabama.

The meeting was called for a discussion of the rapidly increasing use of the telegraph in the conduct of business.

Those present were General Manager H. C. Worthen, Atlanta; General Commercial Agent H. W. Griffis, New York; Commercial Superintendent B. F. Ragsdale, Atlanta; Division Commercial Agent E. P. Crutchfield, Atlanta; City Superintendent C. H. Carroll, Atlanta; City Superintendent C. H. Mulford, Savannah; City Commercial Agent H. C. Ellis, Atlanta and about 40 commercial representatives from the principal cities of Georgia and Alabama.

Direct West India Cable

THE report of the Direct West India Cable Company for year ended June 30th, shows net result of working is credit balance of £11,249 compared with £9,701 for previous year. Balance available is £34,823, less £61, repairs, £3,000 interim dividend of 5 per cent. free of tax and £735 depreciation on spare cable, etc., leaving £31,026. Directors proposed further dividend of 5 per cent., free of tax, leaving to be carried forward £28,026, subject to corporation tax.

Steady Increase in Licenses

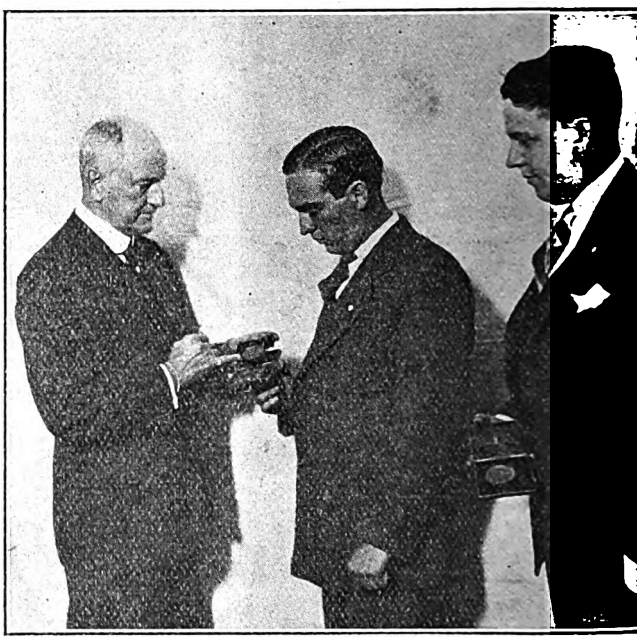
IT is reported that some 912,000 receiving licenses were in force at the end of August, 1924, which figure represents an increase of about 40,000 since July.

RADIO CORPORATION OF AMERICA

GENERAL J. G. HARBORD, president, addressed the National Convention of Military Order of the World War at Boston, Mass., on October 4th.

He spoke before the Society of American Civil Engineers, New York City, on October 15th. The subject was "The Radio and Major Industries."

GENERAL J. G. HARBORD, president of the Radio Corporation of America, on October 20th presented medals for meritorious service performed while in employ of the Radio Corporation as a radio operator, to Elmer Walter and Charles Sullivan, operators on the steamship Boston at the time of the collision with the tanker Swift Arrow off Point Judith last July. The medals carry with them honorariums of $100.



Left to right—General Harbord, Elmer Walter, Charles Sullivan.

A Book About Success

F. E. D'HUMY has written a book about SUCCESS which should be read by every telegraph, telephone and railroad official and employee.

The author has long been a student of the circumstances and forces which are related to personal progress and in this new book he has presented a concept of the subject which enables any one who can read to gain new footholds along the path of life.

This work on SUCCESS is practical. It points out the essentials of objective and character which may be cultivated to advantage by the individual.

Copies of the book may be obtained from Telegraph and Telephone Age, 253 Broadway, New York, at the price of one dollar per copy.

FRIEND: What a horrible noise comes from that radio set!

RADIO FAN: Well, I guess you would make just as bad a noise if you were coming out of ether.

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Telephone Operators Write Language of Their Own in Keeping Record of Long Distance Calls

Toll and Long Distance calls are so called to distinguish them from local calls, that is, calls within the same exchange area. The terms "Toll" or "Long Distance," as far as the telephone users are concerned, mean practically the same thing. The Toll call is a call for which a charge or toll is levied in accordance with the distance covered and, of course, based also on the length of the talking time.

Inasmuch as the Toll and Long Distance calls are charged at a regular scheduled rate, it is evident that in the recording of such calls the greatest care must be exercised so that they may be correctly billed to subscribers or a proper sum collected when the calls are finished.

The public is vitally interested in the methods employed by the telephone company in recording such calls, and the almost meticulous care used in completing and timing them so that there may be no overcharge to the telephone users, and on the other hand, that the company may be properly compensated for the use of its facilities. Many calls require the exclusive use of telephone apparatus and equipment costing hundreds of thousands of dollars to install, large sums of money and constant effort to maintain, and the co-operation of a large number of highly trained employees in their operation.

The actual timing of the call is done by the outward operator by means of a mechanical device known as the calculagraph. The record shows the talking time and also shows the amount of preliminary work on the part of the operating force for which no charge was made.

The average person unfamiliar with telephone practice would have difficulty in translating the complete story of this call from the somewhat cabalistic code used for the sake of brevity and uniformity in making out a toll ticket, but when translated into ordinary language, the story of this particular call reads as follows:

The Toll Ticket Story.

On January 2, 1924, New York, Cortlandt 1783, Mr. Wright, called Concord, Mass., 0655-W, Mr. E. S. Wallace. The call was recorded by recorder 92, and the calling party was dismissed at 11:07 6-10 a. m. The ticket was sent to the directory position where operator 27 entered the code for the toll center, Boston, and sent the ticket to the outward position.

Outward operator 208, having previously secured the subscriber's line on trunk 20 to Cortlandt, passed the call to Boston, the TCC (Terminating Toll Center), and entered RD (Ring Down) on the ticket upon being advised that Boston would connect her with Concord. At 11:11 a. m., she passed the call to Concord and at 11:12 a. m. she received a report of busy and cleared the circuit. She gave the BY (Line Busy) report to the calling station at 11:13 a. m., released the switching trunk, and drew a line through the trunk number. Six minutes later, she secured the calling line on trunk 17 to Cortlandt and made a second attempt on the call. At 11:18 a. m., upon being advised by Concord that the called number was still busy, she left a call order at Boston and released the circuit. She gave the By (Line Busy) report to the calling station at 11:19 a. m., released the switching trunk, and drew a line through the trunk number.

At 11:20 a. m., Boston reported that the called number was WH (We Have Your Party) and the operator, after securing the calling line on trunk 26 to Cortlandt, reached the called station. E. S. Wallace was there but when the operator reported ready to the calling station, she was notified, at 11:22 a. m., that Mr. Wright was expected in a few minutes. She left word for Mr. Wright, gave the report of delay to the called party at 11:23 a. m., cleared the toll circuit, and underlined the chargeable report on the ticket. She then released the switching trunk and drew a line through the trunk number.

At 11:31 a. m., the calling party asked to have his call tried again, and the operator, having first secured his line on trunk 18 to Cortlandt, reached the called station and, at 11:33 a. m., obtained the report that Mr. Wallace was busy personally. She gave this report to the calling station at 11:34 a. m. and was told to leave word for Mr. Wallace, which she did. She then cleared the toll circuit, released the switching trunk, and drew a line through the trunk number.

At 12:03 p. m. (30 minutes from the time the report of busy personally was received), the operator secured the calling line on trunk 16 to Cortlandt and tried the call again on her own initiative. Mr. Wallace was ready to talk and conversation started at 12:05 p. m., and lasted 3 minutes and 30 seconds. At the finish of conversation, the operator was asked for the time and charge. She cleared the circuit, quoted $2.05 for 4 minutes, and then released the switching trunk.

This call is of a class known as "Person-to-Person" calls, which means that the call could not be completed until the particular person called for had been brought to the telephone and placed in communication with the calling party. Had it been a "Station-to-Station" call, it would have been completed when the calling party had been connected with the number asked for and had talked to someone there.

In the year 1923, the daily Toll connections in the Bell System averaged 1,683,000 completed calls, each of which was handled by the Bell standard practice as above described, modified by the nature of the call and the circumstances surrounding it, but in every case requiring the services of specially trained telephone employees and the use of valuable apparatus and equipment.

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The Kellogg Press

We welcome to our columns the advertisement of the Kellogg Press in this issue.

The Kellogg Press is the enterprise of two young men, one of whom is Charles Shirley, Junior, whose father is a well-known telegraph man, formerly manager of the operating department of the Postal Telegraph Cable Company, and later city superintendent in New York.

This is a little sketch relating to this enterprise, written by a newspaper woman who is a friend and admirer of the courage and diligence shown by young Mr. Shirley and his partner.

The Age trusts that the comparison of this concern to a mushroom—which is notoriously short-lived—will not be borne out by the facts. But we would prefer to use the acorn which eventually grows to be an oak—as a comparison for this modestly begun and already flourishing business.

Talk About Mushrooms

By a Newspaper Woman

Here is a mushroom story. The growth of the Kellogg Press. In August, 1923, the first seed was planted. Two young men did the planting. One had had eight years of successful experience in printing; for large corporations. The other was an expert accountant. They planted the seed—a little Multicolor Press, plus a few accessories—in two tiny rooms on West Broadway, where the "L" curves into Murray Street. The rooms were so small that when one partner sat at the desk he had to "hitch" his chair for the other to pass!

The Kellogg Press was as humble as Guttenberg's. There was one marked difference, however. Since the days of Guttenberg, Benjamin Franklin and Thomas A. Edison have lived; some magic "juice" made the embryonic mushroom rattle off about four thousand letter heads an hour!

There were floods of sunshine in the tiny, shabby rooms. Now, most mushrooms grow best in the shade, but this one disproved all rules. In a few weeks a second Multicolor and a third tiny room sprang up. But oh! they were so cramped! Mushrooms need space.

In November they were transplanted to an entire loft at 85 Warren Street, where they can grow—for some time at least. During the winter two larger presses, fonts and fonts of type, and lots of other things, appeared. And now, after just one year's growth, a magnificent new Chandler-Price Craftsman, with a Miller Feed, is the biggest and best mushroom of all!

Third Annual National Radio Exposition

The Third National Radio Exposition, under the management of the American Radio Exposition Company, 522 Fifth Avenue, New York, will be held at the Grand Central Palace, New York, from November 3rd to 8th. Everything in radio will be admitted in this exposition. All the latest inventions will be shown and many manufacturers will bring out their new models.

What Did Mr. Edison "Sine"

P. S. Durgin, manager of the Postal Telegraph-Cable Company, Boston, Mass., is mindful that at one time Thomas A. Edison was a telegraph operator in the "Hub." Being telegraph operator means having a "sine." Mr. Durgin sent out a tracer to learn what Mr. Edison's personal signal was when he worked in Boston.

The list of telegraphers who "worked with Edison" used to be about as long as the list of sailors who "Fit with Dewey," but the few who are still in the land of the living have no recollection of what Mr. Edison "sined."

Appeal was made to Donald McNicol, New York, for a report of what copies of original messages show—messages copied by Mr. Edison. To add to the mystery the various original copies which Mr. McNicol has indicated no receiving operator's "sine" although the messages were actually copied by Mr. Edison. One of the Boston messages, particularly, is a press report copied by stylus on a flimsy. It shows no receiver's signal. With reference to this, Mr. McNicol learned from Mr. Edison that while in Boston he worked as a press operator and that at that time press operators used no personal "sines."

Mr. Edison began his telegraph work at Stratford, Ontario, as night operator on the Grand Trunk Railway, in the year 1863. Later he was employed at various places throughout the middle-western States: particularly at Louisville, Ky., and Cincinnati, Ohio, where he worked in 1866. The late Walter P. Phillips once told Mr. McNicol that his impression was that Mr. Edison sined "N" while he worked in the West.

The inquiry launched by Mr. Durgin, of Boston, opens up the entire question of the date on which operators' personal sines came into use. Upon the introduction of Morse's telegraph in 1844, Mr. Morse employed as an acknowledgment of receipt of a message the letters "i i" followed by the office call, but these letters were soon replaced by the symbol "OK." The symbol "OK" was derived from the political campaign of 1840, when the words: "Oll Korrect" were in universal use in speeches and in the press of the day.

An examination of a large collection of early "received" telegrams discloses that personal symbols of operators began to appear in the year 1857. Copies of messages received in the Philadelphia, Penna., office of the Magnetic Telegraph Company, in the summer of that year bear the receiving operator's letters. For many years later than this personal signals evidently were not required from offices where but one operator was employed; the office call following "OK" being sufficient acknowledgment. In the larger offices, however, where several operators were employed it became necessary as early as 1857 to identify each operator by his personal "sine."

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Why Some Succeed and Others Fail

By Willis H. Jones

Recently the officials of the Western Union Telegraph Company, at 195 Broadway, New York, with a view of encouraging employees to suggest new ideas for improving the service and apparatus in use, as well as to give each a chance to advance their own personal welfare, caused a cartoon to be placed on the blackboard which showed plainer, than words could tell, just why so many fail to get ahead in this world and the true reason therefor.

The sketch showed the figures of two different employees. One of them with a happy smile on his face was depicted dancing around waving a big check in one hand and shouting, "Oh, Boy!" just see what the boss gave me for my new invention!"

The other man's face was depicted as showing the very last word in despair and disgust, as he arose and shouted, "Gee Whiz! Just my luck! Why didn't I tell them about it before he did, I thought of the same thing long before he did!" (or words to that effect.)

The lesson to be learned is that while thinking is the first step necessary for success, thinking alone will get one nowhere. Thoughts must be followed by action. In other words the thinker must try out his ideas himself or get somebody else to do it for him. Don't wait till another gets the same idea and crowds you out.

No stronger proof of the accuracy of this claim can be produced than by pointing to the achievements attained by the present heads of our Morse and Multiplex Printer departments, respectively, each of which was known to be an active and persistent hard thinker. Let us see how they did it.

When the old Western Union and the American Telephone companies first got together under a new arrangement many important places were filled from the ranks of the latter company. Among the newly appointed officers was W. E. Athearn, general electrical engineer, with instructions to ferret out all the weak spots and make improvements with a view of equipping the New York main office at No. 24 Walker Street, the building of which was already contemplated, with a strictly up-to-date standard type of apparatus for the uniform equipment of all main offices.

For this purpose Mr. Athearn selected for his first assistant the man who through the policy of first measuring the value of his ideas by a thorough try-out before adopting them has brought about our present high degree of efficiency. Needless to say he still holds the same job. He did not stay in his private office and try to figure it out, but spent several hours each day for months in the operating room examining each apparatus and asking questions. Some of the weak spots he discovered will show the importance of being on the spot.

First—The lamps, sockets, and fuses, he learned, were all out of sight under the tables. When a resistance lamp lit up owing to a short circuit creating too much current no one would know it till the fuse blew out. Hence he decided that in the new office they should be located on top of the shelves in plain sight of the attendants.

Second—The apparatus in many sets were not of a uniform type nor similarly arranged. He decided to install nothing but standard types, located and wired in an authorized uniform manner so that any attendant from another division would be equally at home if called upon.

Third—The tables for Morse operators were mostly flat and unsuitable for typewriting machines; then rapidly being installed. A new design was the result.

In like manner he learned that spring jacks in the old type switchboards caused hidden trouble through loose and rusty joints causing high resistance; cords were too long and soon wore out. Result—the adoption of the Pannel type with telephone jacks and detachable cords of various lengths.

Finally, having finished his search in the operating room he asssigned a competent thinker in the laboratory to take apart each separate Unit instrument, examine its mechanism and suggest improvements. He found that in some types of relays and sounders the wire connections were made simply with screws and nuts which often got loose and suggested that hereafter all joints should be soldered to a more satisfactory type of binding post. In this way all weak spots in other apparatus were tested and remedied.

The next thing in order was to increase the electrical efficiency of the magnets and their windings. The desire for greater speed demanded a quicker charge and discharge of the magnet, or iron core itself. How could this be accomplished when it was well known that the core must not be no shorter than the length required to wind around it a coil of wire not to exceed in diameter the diameter of the core itself? Here, again, is where "thinking" won out.

As old type relay and sounder magnets were then wound with silk insulated wires that portion of the permissible space occupied by the coils fabric was obviously wasted. Why not use enameled wire and get a greater number of convolutions within the same space, but on a shorter iron core? The shorter the core the quicker will the magnet charge and discharge. This policy was adopted and incidentally done away forever with the frequency with which the old coils became short-circuited, crossed, and burned out.

The above are but a comparatively few examples of what thinkers accomplished, but sufficient to prove the importance for following the advice so strongly suggested in the cartoon referred to.

———o———

James B. Yeakle, superintendent of Fire Telegraphs, Baltimore, Md., celebrated his sixtieth wedding anniversary on October 6th.

In a recent letter Mr. Yeakle says: "Thank you for keeping me on your list. I always feel like I'm in good company when I get the Age."

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Communication from Point to Point at Railroad Terminals

In the making up of railroad trains, making of reservations, transfer of tickets and baggage checks, transferring of way-bills and reports, at railroad terminal offices, the modern tendency is to eliminate delay with all its attendant costs, and to reduce to the minimum the time occupied by employees in walking from point to point in the performance of routine duties; duties which are numerous and extend throughout the twenty-four hours.

At Harrisburg, Pa., the Pennsylvania Railroad has in service a complete system of pneumatic tubes extending from the General Telegraph office on the second floor of the depot, to the ticket office on the ground floor, and by underground tubes outside of the depot to the station master's office, 350 feet; car inspector's foreman, 500 feet, and to the train director's office, 800 feet from the central telegraph office. The system is of two and a quarter inches pipe and uses carriers six inches in length. A motor-blower unit situated in the basement of the depot supplies the air pressure.

At Potomac Yards, Washington, D. C., a four-inch pneumatic tube system, actuated by air from the track signaling system, extends from the general offices to the freight offices and sheds.

Another plant installed by the Pneumatic Tube Supply Company, Plainfield, N. J., is that in use by the Pennsylvania Railroad in the large New York terminal building and yards. Two-and-a-quarter inch pipe is used and air pressure is from the track signal air supply. From the general telegraph office there are four outlying stations; ticket office, Pullman office, car inspector's office, yardmaster's office, and from there a line to Tower "A".

There is available also a system of four-inch tube lines for the transfer of baggage checks.

A number of railroads are considering plans having in view the installation of pneumatic tube systems for the purpose of speeding up operations, and transferring orders, waybills and manifests as originally prepared. Obvious savings in payrolls are thus effected and such systems are instantly available at all times night and day regardless of weather conditions, and at an upkeep cost which according to all reports is surprisingly low.

Telegraphers of Today

We find that we have on hand quite a number of copies of "Telegraphers of Today," which is a book made up of 354 pages, printed on heavy coated paper measuring eleven inches wide by fourteen inches in height. This large book contains over a thousand sketches of telegraph people, together with a biography of their lives. It is a splendid work and was printed in 1894. It is used extensively in the libraries of prominent telegraph and railroad people. While these books last, we will sell them at $5.00 each and we will prepay the carrying charges. Address and make remittances to Telegraph and Telephone Age, 253 Broadway, New York.

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CONTENTS

PAGE

Mind Training for Health and Success. By W. H. Candler..... 508

Birthdays, Watches, etc. By J. Frank Howell..... 513

Telephone Company Scores in South Carolina Rate Case. An Open Road in Radio..... 514

Broadcasting from the Zoo. Placing Radio on the Map of the World.... 515

Origin of Broadcasting by Radio Telephony..... 516

Fifty Miles from Nowhere. By W. Lee Dickson..... 517

Editorial. Dedicated to the Memory of the Old Time Telegraphers of the Past and Future. By J. A. McIntyre. Awards for Radio Invention. Eighteen Radio Studios Linked on Defense Day..... 520

The Railroad-Telegraph and Telephone Section of the American Railway Association. W. W. Atterbury to be President of the Pennsylvania Railroad. Committee of Prominent Engineers..... 523

The Forty-first Reunion of the Old Time Telegraphers and Historical Association and the Society of the United States Military Telegraph Corps Held at New Orleans, La..... 524

Novel Telephone Uses 526

Personal. Postal Telegraph-Cable Company. Obituary. Halifax Cable... 527

Western Union Telegraph Company. Rhode Islanders Get 100,000th Telephone. The 1924 Year Book of the Merchants Association of New York..... 528

New York Telegraphers' Aid Society. Radio Antennas Not Lightning Menace. Radio Sets for the Blind. 2,700,000 Words Sent Over Washington Wires During World's Series; said to be a record..... 529

Father of Wireless. Try the Operator's Way of Saying Them..... 530

KDKA, World's Pioneer Broadcaster, Four Years Old on November 2nd. 531

Facts About the Telephone, Cablegram Mutilations in India. Radio Corporation of America. Telegraph and Telephone Life Insurance Association. 532

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Mind Training for Health and Success

By W. H. Candler

The following article on Mind Training for health and Success is the result of fourteen years work in developing high class operators all over the English speaking world through the method known as The Candler System.

While working in a large commercial relay office many years ago where I came in daily contact with hundreds of telegraph operators, I discovered that 90 per cent. of them were far below the average in health and that 50 per cent. of them were actually unfit for the work they were doing, unfit both physically and mentally.

While working at top speed in this same relay office I suffered a nervous break down which left me with a pronounced case of telegrapher's paralysis which consequently incapacitated me for first class work. From a fast bonus wire I was relegated to the "woods" where I managed to get by, using my left hand with poor results.

"There must be a reason," I said. Old timers shook their heads wisely and said that there was a reason, but no one knew what it was. Even the doctor to whom I went in the hopes of obtaining relief, shook his head and marveled at the inevitable, and with a long drawn sigh, peculiar to the profession, informed me that "vocational paralysis was incurable."

I began a series of experiments to try and find the reason for "lost grip." After three or four months I made the discovery that certain little nerves and muscles in the fingers, wrists and arms had become impoverished from congestion, poor circulation, caused in part by the position of the hand and arm on the telegraph table, the strained condition combined with the mental reflex (there is always a mental reflex) produced the result which we know as "telegraphers' paralysis," or which may sometimes manifest itself in the form of writer's cramps, or else in an arm that is "half dead" and will not function with the former "snap."

When I set about to formulate a system of physical exercises to develop these nerves and muscles, I ran up against a stone wall. That stone wall was nothing more or less than the Mind. What part did it play, and how was it directly influenced to produce this condition? Could it be inversely influenced to produce the opposite effect, and if so, what medium could be scientifically employed?

The physical exercises I formulated were instrumental in bringing about a measure of relief; but, in so far as restoring the crippled arm to its former condition, they did not prove a big success, and it was not until I had succeeded in "Connecting up Properly, the Actual Mental Relationship" of the telegraph operator's work, did I begin to observe satisfactory results, and soon nearly all the operators with whom I worked were reaping the benefits of my discoveries, and this was well, for I was able to carry my experiments further than I would have otherwise.

In 1911 I published a small book containing the principles of what is known as The Candler System. It met with instant success, and went through many editions and revisions. Letters began coming to me from operators all over the world. In 1917 the volume of my correspondence became so large that I disengaged myself from all other duties and since then have devoted my entire time and energy to building operators up to the maximum of Health, Energy, and Efficiency. The system has gone through many editions since then and has been constantly revised as my knowledge has been broadened by experience. Our office records show 38,000 operators located in all parts of the world who have taken the system. We have a truck load of letters from operators telling us of the many wonderful things they have accomplished through the system, and I value these letters of appreciation far more than any monetary rewards I have received for my services.

WALTER H. CANDLER

Our one great handicap, I suppose every business has some draw-back, has been to succeed in convincing operators that we can actually do what we claim. Many of them tell us afterwards that they took the system because they were hopeless, but that they actually didn't believe it would do anything we claimed it would, but were agreeably surprised

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find that it did even more than we claimed for

The accompanying article is not The Candler stem. It has been inspired as a result of my ex-iences and is being published with the belief of . Taltavall and myself, that those who read it l be greatly benefitted. This principle has ped thousands and thousands of others, and we no reason why it should not help you to a better lerstanding of life and the process we know as ving."

take this occasion to thank Mr. John B. Talta-l, Publisher of this magazine, for the invaluable operation he has always given me in my work building efficient telegraph operators.

'Hypothetically, we have two minds; Conscious d Sub-Conscious. The Conscious Mind is the t of the Will; therefore, I shall refer to it as e Will; the Sub-Conscious Mind is the seat of e Imagination. I shall refer to it as the Sub-ind. The relation between the Will and the agination must be understood before one can ke any satisfactory progress in mental training."

The Will is, primarily, positive, but it may, under rtain conditions, become negative. The imagina-on is neither positive nor negative, except only, nen it is influenced by the Will. It is amenable the Will but is not always controlled by the Will; e Will is frequently controlled by the Imagina-on, as we shall see presently. First, we must de-ne both the Will and the Imagination specifically that we may distinguish them and speak of them telligently and understandingly. To do this, we ill use a common illustration.

The Will is analogous to a parent; the Imagina-on to a child. The inherent duty of the parent is rear and train the child to conform to the man-ates of society; to employ every customary means training it for the future responsibilities of citi-enship and parenthood. The child is, comparatively, responsible; its mind is plastic, impressionable; it easily influenced, and it will gradually grow into conformity with its surroundings; that is, by ac-uiring the habits of those with whom it is daily ssociated.

The child is amenable to the parent, but sometimes ne parent, by indulging the child's whims in the ex-reme, gradually loses control and eventually be-omes subject to its dictates. We have observed hany such instances where the child ruled as im-erial dictator. This is an unfortunate situation, lways accompanied by a disasterous climax. Any hild that has been reared with a lack of mental nd physical discipline becomes morally impover-shed and does not develop character or other mental ttributes that enable it to surmount the natural bstacles of life, hence it is invariably inclined to-vard the Road of Least Resistance. The penalty s visited upon the child and the parent.

This analogy may be carried on. The child has a ood mind, and with the proper influences and train-ing during its formative years, develops proportionately and grows to maturity and achieves success through its service to mankind, and becomes a credit to its parents and those who were responsible for its early training. We achieve success through service to mankind, not to ourselves individually. Mankind is the Master, we are the Servitors. We gain by serving. He who serves best gains most. This is a law, not a theory.

Hold this thought.

In defining the Will and Imagination, and for you to retain and tangibly visualize it, I use the parent and child illustration. Figuratively, the Will is the parent, and the Imagination is the child.

The Imagination is plastic, impressionable; also irresponsible, because it cannot reason. It is Memory's Storehouse. All experiences, sensations, data, information, ideas—thoughts, are stored there for future use, subject to the call of the Will. If the Will is and has been Master, not by force, but by training—both of itself and the Sub-Mind, it can call for, receive and consciously employ this information as needed and desired.

The Conscious Mind is the seat of Reason. Its function is to direct the Sub-Mind. When it goes to sleep, which it is supposed to do, under normal conditions, every night, it abdicates the throne of reason, leaving the house in control of the irresponsible child, Imagination, which never sleeps.

If a child has been correctly trained, it usually will behave properly when its parent is away from home. If it has been indulged and allowed to have its way, or has been nagged at, threatened and scolded or otherwise subjected to a false discipline, it immediately indulges its whims at the first opportunity.

The same is applicable to the imagination. When it has been indifferently trained, if so at all, and loosely disciplined by repeated resolutions and declarations which are subsequently broken in the form of self-indulgence for temporary convenience and pleasure, when the Conscious Mind goes to sleep, it runs riot. This accounts for weird, fantastic dreams and so-called nightmares. It also accounts for the fact that some people seem to be born to failure while success, apparently, is thrust upon others.

Function of the Sub-Mind

Comparatively, the Sub-Mind is the index of the mind; or, it may be defined as the mental reservoir, where knowledge may be stored in orderly fashion and readily accessible as with trained minds, or crowded in, helter-skelter, with no thought of arrangement as with untrained minds. This may be illustrated by one who receives daily a hundred letters all of which are promptly answered and filed alphabetically, ready for instant reference when needed. Such procedure avoids confusion, irritation, waste of energy and loss which would result from throwing the letters about carelessly.

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A man cannot succeed in any kind of business without first systematizing his work. If he spends his time and energy hunting through a pile of rubbish every day trying to find what he wants, he will not have the normal ability to give it the required attention when he finds it—if he does.

How much more important is the mental process of arrangement than the mechanical?

A letter cannot get into an office file without someone putting it there. The very fact that it is there is evidence that someone put it there.

A thought cannot reach your Sub-Mind without it being put there by the Conscious Mind. If it is a worthless thought, the Will, alone is responsible for it. If it is a good thought that will eventually materialize into something of value, the Will must be credited for it .

Every thought that enters the Sub-Mind does something. What? Influences the Imagination! That influence may be either good or bad and it reacts proportionately. If good, the reaction strengthens the Will; if bad, it weakens the Will. Therefore, the Will is strong or weak accordingly.

The Habit-Forming Mind

The Sub-Mind is habit-forming. The Will has nothing to do with habits except that it encourages, condones, or discourages them. If you drink, use dope, lie, steal; are subject to fear, apprehension, fits of unreasonable anger, jealousy, or have any other habits that will eventually pull asunder and utterly destroy your moral fabric, they lie rooted in the Sub-Mind, but they had their inception in the Conscious Mind. Possibly its repetition was at first discouraged by the Will, until such repetition gradually became a necessity, then the Will gave way and became, in so far as the particular habit was concerned, amenable to the Imagination. The drunkard knows it is wrong to drink but is helpless to prevent it because his Will must obey the capriciousness of his Imagination. He began by taking a drink occasionally until one drink began calling for another as the habit began forming, by repetition, in the Sub-Mind.

When a man does anything by force of habit, he does it Sub-Consciously, whether the habit be good or bad. The Sub-Mind reasons not to the contrary because it cannot reason, it does it. If one has, through neglect or carelessness, acquired that "never-well-habit," the bane of all doctors, all medicines and other remedial agencies are powerless to relieve him. If one has acquired the "failure habit," success is impossible. So long as the Sub-Mind governs the mental activities, which it always does where habit is involved; that is, in so far as that habit is concerned, the Will is helpless.

When the Will and the Imagination come in conflict, where habit is involved, the Imagination always wins. If you try to write a book, preach a sermon, edit a magazine, run for congress or do anything and your Imagination tells you that you cannot do it, no matter how great your desire nor how much you use your so-called Will-power, you cannot do it and you will never do it until you master your Sub-Mind. You cannot master it by simply "making up your mind" that you are going to do so any more than you can become a doctor, minister, an engineer or architect by thinking it. It requires training. If you would rid yourself of a bad habit or acquire a good one, you must abandon the antiquated idea of force, for there is a better and more practicable way, as we shall soon see.

Function of the Will

The process of habit elimination or addition is not clouded in mystery.

Education is the habit-forming process.

One's productiveness or non-productiveness, ability or lack of ability, usefulness or uselessness, health or lack of health, success or failure, are determined solely by one's habits.

All habits are implanted in the Sub-Mind by repetition of the Will or Conscious Mind.

After a habit has been formed it manifests itself regardless of or even without the knowledge of the Will; such is also the case when it has to do directly with the Will. Therefore, if the habit is one of Will-Mastery, it readily may be seen that the Sub-Mind contributes largely to such mastery in the same measure that it can and may oppose it. Such aid or opposition the result of the training of the Sub-Mind by the Conscious Mind. Understand, I say training—not force. There is a big difference which must be understood, and to be sure that you do, I shall use an illustration.

You decide that you want to become a lawyer. Now, can you become a lawyer by wanting to be one or by thinking you are one? No. What then is the procedure? First you have the desire. What ever influenced it I shall not discuss now; you have it—the conscious desire to become a lawyer. All the information you have on the subject is stored in your Sub-Mind. You review this consciously and visualize yourself as a lawyer pleading at the bar, and many other interesting things incident to the practice of law. This visualization continues from day to day. In other words, this auto-suggestion is constantly repeated by the Conscious to the Sub-Conscious until it becomes real. You, possibly without knowing, gradually assume all the characteristics of the profession long before you begin the study, and this intensifies your desire causing you to think, in so far as your knowledge will permit, in legal terms. You begin the study of law, and constantly your Sub-Mind is given pictures of yourself as a successful lawyer; this maintains interest and influences ceaseless endeavor. This desire, interest and work continue until your Sub-Mind has stored in it sufficient legal knowledge to enable you to become a lawyer. Desire and interest influence memory, but we will handle that under another heading.

When you begin the practice of law, if your de-

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ire and interest continue unabated or are intensi-ed by the actual practice of law, you grow in the rofession and become a big success. On the other and, if you lose interest in the work, you have no esire to push forward or exert yourself, conse-uently your progress is limited, This is what stablishes the difference between lawyers, and is ikewise applicable to every human endeavor. The ne big thing necessary to successful achievement is *nterest*. The old saying: "Where there is a will here is a way," may be changed slightly to read: Where there is interest there is a will. Interest is paramount.

If you study law or anything for pastime, or do anything in a desultory way, caring not particularly whether you succeed, your efforts are virtually wasted. It is entirely possible for you to employ the Will to force yourself to do something for which you have no liking or in which you take no interest, but, unless you do develop interest in some form or another, you will not succeed.

William James said that a man ought to do regularly every day two or three things he does not want to do, just for practice. Dr. Frank Crane says that the essence of will power is the willingness and ability to set oneself in opposition to desire, that you have to learn to like to resist doing what you most want to do.

You will, of course, observe that the practice of doing things, because we do not like to do them, cannot reasonably be of benefit; that more satisfactory results will obtain from doing the things we like to do. At any rate, it is evident that the most beneficial form of practice, likely to be productive of desirable results, is to implant the idea in the Sub-Mind by repeated auto-suggestion, that we do like to do and are interested in doing the things we ought to do for our benefit, which we thought we did not like to do. We make a serious mistake when we try to force ourselves to do something we do not like. The logical way is to train ourselves to like it, then force isn't necessary. We will examine this phase of the subject again.

The Sub-Mind is Lazy

The Sub-Mind is self-indulgent. It revels in luxuries, ease, comfort. It will not assist the Conscious Mind in any way whatsoever unless it has been trained. Like a little circus dog, it takes a great delight in doing what it has been trained to do; it takes as great a delight in not doing what it has not been trained to do. In this connection it is lazy. It likes to rule and control the faculties and is pleased when the Will is being lulled into repose—sleep, and it immediately takes full charge. This will explain why the drug and whiskey habits so quickly fasten themselves on one. They are artificial agents which lull the Conscious Mind into a state of inactivity, or border-consciousness, where fantastical and pleasant reveries become realities and the mind, as a whole, is in a state of ecstacy. Such habits are most easily and quickly acquired and hard to break, and can be broken only by conscious effort which must spring from a desire; if this desire is not in evidence, little can be done, unless through the influence of a higher or moral obligation, it may be implanted in the Sub-Mind by means of auto-suggestion. If such auto-suggestion is repeated persistently, the Sub-Mind will accept it and unconsciously assist the Will to consciously discontinue the habit. In other words, the desire to continue the habit will grow less each day and in like measure, the desire to discontinue it will become stronger, and the successful accomplishment of all conscious effort strengthens the Will.

Conscious effort is necessary to accomplishment, and the only thing capable of such is the Will. But, without the aid of the Sub-Mind, the Will is powerless. This may seem paradoxical, but I assure you it isn't. I shall illustrate. A general on the battle field with a large army, issues commands, and the army, following and obeying him, is victorious. Therefore, the general is victorious. So long as his army obeys his commands, it is a powerful factor and he is a power to be reckoned with. But, without his army he is powerless. He could not win a battle alone any more than the army could fight it in the absence of a commander.

Figuratively, the Will is a general and the Sub-Mind is the army. The general must be trained to give the right commands and know when to give them, and the army must be trained to obey these commands. A man can accomplish anything he wants to if his Conscious and Sub-Conscious Minds co-cordinate in the endeavor and both have been trained in the details necessary to its accomplishment. In the absence of such training, results are never satisfactory, notwithstanding all arguments to the contrary.

In order to be sure that you will understand this phase of the subject without question, I herewith quote, verbatim, a letter from a telegraph operator who came under my observation sometime ago. His case is typical and illustrative:

"This is an awful story, but you must have it if you are to do me any good. I am extremely white and delicate and sensitive; suffer pain easily, am hurt by every look, gesture or word of another man or woman, and to make it worse, have a terribly hot temper to go with my sensitiveness. Am so nervous and sensitive that my left (writing) hand shook and quivered so it completely broke down in 1915, and developed sharp, aching pains which the doctors said was neuritis. I tried everything to help my arm, but with no success; tried writing with my right hand, but Nature is not to be fooled. My right hand will positively not work on key or in writing, that's settled.

"In 1916 I had a complete nervous collapse. I sank to the ground, got up slowly and walked a block. I went to bed and was unconscious for thirty-six hours. To this day I do not know whether it was a partial paralytic stroke or a nervous collapse, but I felt and feel now that some part of my brain broke down completely, causing

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the dizzy spells which I have had ever since for at least four hours out of each working day. I got a little stronger and went into a small telegraph office where I have stayed, or layed, ever since. I could not get very far or do much with my arm in constant pain and my head dizzy. I have tried other kinds of work but with no success. I like carpenter work but am not strong enough for it. I have tried examinations on railroad for train service, but failed utterly. They tell me I am color blind, but the doctors said my eye-sight is about perfect.

"For me, life is a continual hell. I always thought I was going insane, but one of the greatest Nerve Specialists in Milwaukee told me that I am a misfit human of the worst kind and that I am entirely separate from an insane person. He gave me a terrible mean going over and said I was too much of a coward to commit suicide, as people of my type are always cowardly.

"I do not think anything can be done for me, but I am still a man and want to try for 'hope springs eternal in my broken heart.' My poor wife must have been crazy when she married me, but she was young and innocent and ignorant of the world. Now our home is broken completely, smashed to kindling, for I can neither support her or our dear baby. She has made it very hard for me. I wish someone could wake her up to just what my condition is and tell her a thing or two about how to handle me. She is smart, very Christian-like, exact, and thinks all the world of me. She constantly wanted to lead me into parties and dinners given by her folks and others, but I could never make her understand just how I felt and about those dizzy spells that come on me every day about 4 P. M. and continue until 8 or 9 P. M.

"This is the whole of the story and is the truth. I don't think anything can be done for me, but still I am trying. I am doing some wonderful work in physical culture and taking long walks. I swing Indian clubs for my chest, take leg exercises, etc. I eat very carefully of fruits, soups, nuts and very little meat, but nothing does me any good. If something is not done it will be a grave for me within a year; that seems inevitable, much as I am fighting my afflictions.

"At the sign of any kind of trouble, I simply go into a regular nervous convulsion, and it is the constant fear of trouble that keeps me away from my fellowmen. I have been told by doctors and others to use my will power, but how can I use something I do not have. The more I try to keep these spells from coming on the more frequent they will come and the worse they are. I believe no mortal ever was so hopeless as I."

This man spoke the truth. He had no will power. His Sub-Mind, Imagination, was in absolute control and ruled without direction, with the exception of a few bad habits; dizziness, nervousness, fear, apprehension, worry and hopelessness. Could the Will, working alone, overcome these habits? Yet the habits had to be removed from the Sub-Mind, and the only means of doing this is the Will. But how is the Will to act when its power is gone?

This is what I directed him to do: "Each night upon going to bed, say audibly to your Sub-Conscious Mind, as though you were addressing a servant, the following: 'My Will is Master, my Sub-Mind is helping it to be Master and I will obey and carry out its commands.' Repeat this suggestion until you go to sleep. When you awake mornings, repeat it fifty times. Continue this for one week, repeat the following suggestion to your Sub-Mind the same way for one week; 'I am well, I am strong, I am confident, I am fearless. My organs function as they should, I feel good.' After following this for a week as directed, follow the first one for a week, and so on, alternating each week."

After he had been following my directions for three days, he wrote to me as follows: "I am following, faithfully, your directions, and I must admit I do feel some difference, but I do not see how it is possible for me to make much headway, feeling as I do."

At the beginning of the second week, he wrote: "I find it much easier to go to sleep by repeating the suggestions, but that is about the only difference I see. I get very nervous during the day and become angry with myself for being so weak. I really prefer death to my condition."

He finds it easier to go to sleep by repeating the suggestions, but observes no other change. Yet he says he becomes angry at himself and nervous. This indicates a mental and, consequently, nervous reaction. It isn't anger he experiences, it is his Will beginnng to functon. Now let us observe what results he obtains after following directions for two weeks. I quote from his letter: "When I get up mornings I feel fairly good, but this feeling gradually wears off, and by 5 P. M., I am in as bad a way as ever. I do believe, though, that I am making a little progress, but it is slow."

At this stage he believed he was making some progress but that it was slow, and naturally it would be slow after being in the condition he was for so long. His progress was steady from week to week, with occasional slips caused by mental and nervous reactions which he didn't understand. At the end of eight weeks, he wrote as follows: "I am unable to find words to express my gratitude for the wonderful help you have been to me. I feel like another person; all nervousness, fear and dizziness have disappeared and I have taken a new lease on life. I have never felt better or happier and I feel myself improving every day. My wife and baby are with me now, and really, we have just commenced to live. We will never forget what you have done for us."

(To be continued.)

The subscription price of Telegraph and Telephone Age is $2.00 per year.

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Birthdays, Watches, Etc.

By J. Frank Howell

In days long ago when salaries were small and ome chief operators much smaller, there would be ound among the flock someone ready to pass the st for contributions for a watch or other memento or the chief's birthday. Such was the happening o Chief Operator Topliff of St. Louis, a nice shiny old watch and chain was presented him and while e received it all right, if he was much pleased his ubicund countenance did not show it to any great xtent. He did, however, give a low grunt ala the ndian sign and scan the list with great precaution. While there was a number of contrabands on it, e was by no means pleased. He designed to ooze umor by asking the spokesman what this meant nd what would be expected as a result. Of course his left one of his henchmen slightly bewildered emporarily, but this was quickly overcome.

Some two years went by and another birthday was approaching under a more or less changed condition experienced from the wage sliding scale, when some one thought of doing something for "our chief." A different leader sprung the idea as if original, and circulated the petition, getting enough for a watch but no chain. This was presented and the mobile chief listened to the flowery speech accompanying the amateur presentation of the jewelry. When through with it, the first thing "Top" said was where is the chain that goes with the watch.

I did not happen to be one of the contributors, in fact never was so gifted as I did not believe in contributing to the egotism of the chief operator, but I was on the list when the query was doled out. This was the last contribution to "Top," and eventually he went the way that all such noble and generous dispositions go!—it was to the Key, but transferred his services very shortly afterwards to the opposition.

The operators did not think much of the Chief Operator's ability as displayed and were up to all kinds of pranks in their leisure moments.

The quadruplex in its infancy was not entirely perfected and the chief operators did not know too much about this piece of mechanism; when the wires were showing a great deal of trouble, the chiefs had their hands full without watching the operator's trickery. Some of the "students of science" among the 'ops found out that by turning a local switch in the rheostat a complete unbalancing would result and both sides would duplicate. Naturally this would be the signal for an all round "balance" by the chief, generally causing considerable delay and a big loaf for the 'ops.

The office had a new "check boy" a round faced German, who was called over one night just after finishing a lunch in which there was a box of sardines. On emptying the box, the box was wrapped up carefully and the boy told to give it to the Chief Operator Topliff, and tell him there was his "Pocket Duplex,"—about this time the operator went to the wash room. "Top" flew into a great rage receiving the Pocket Duplex and asked the "Heiny" who sent the package to him. The boy did not know the operator's name and the operator was out for the time being, but "Top" had his suspicion and on the return followed the man about the room, finally accusing him, with no satisfaction. The operator was supposed to be off duty at one o'clock and "Top" to get even, insisted on his remaining until three.

Notwithstanding all this, the office had among its force some of the best talent in the country, most of which was local—this together with the floating supply made the Chief's life miserable.

Among the chief operators on the force was C. J. Lawson, a great stutterer, especially when excited. He had been in his position a sufficient time to have confidence to enable him to lose his temper very easily. One day when the wires were badly mixed one of the operators while watching his actions wrote out a wire message, handed it to a new boy, directing that he connect the National Stock Yards with the regular noon day press fire. Looking this over Lawson sensed the absurdity and immediately exploded ala Tom Kennedy, so scaring the new boy that the boy ran out of the room, never returning. In the office another interesting episode that gave us much amusement was worked to the limit, as such things are apt to be, but even so it provided rare fun on occasions. It seems that one of the operators was an epileptic and on occasions would be given to the fits that accompany such a condition. On one of these occasions the operator alongside him acted the good samaritan and handled him so well that on the next recurrence of the fits, "Top" assigned the same operator to the aid of the patient and later told the operator to "look after the case in the future." As "Top" had invariably been in the habit of "picking on" the operator heretofore for any "roast" that might develop, the latter thought he saw a good chance to get back at the chief, so he turned to the fit thrower after one of the unpleasant visitations of the infirmity and asked "can you accommodate me sometime by performing the fit act?" Being assured that it could be done, the good samaritan bided his time until he was picked for a roast by "Top." When it arrived he gave the fit thrower the signal and a fit was immediately thrown, whereupon "Top" said: "Blank, take care of him." After that and for sometime the fit-scheme was worked at least once a week and the "roast" avoided for the reason that the fits did not run on any special schedule, being adapted to circumstances.

All large offices have someone to pick on and this fell to the lot of the Eckert boys to be the goats—they bore a rather fastidious disposition. Whenever any special outside work was to be had and any one of these boys would catch the receiving side, it could almost be depended that a general roasting would be in order as quick as they were known to be on the wire.

Among those on the force at that time were Jim Townsend, Jack Magill, Homer Gray, Frank Kas-

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par, Jay Lane, W. E. Beckley, C. Percy Higgins, T. P. Wheeler, Edward Altemus, Harry Tuthill, Mort Shaw, John and James Cassidy, Mark Farley, R. H. Bohle, the three Eckert brothers, Dr. Johnson, Ernesthausen, Al Tong, Larry Boone.

This office was looked upon as being in the run of popularity with Cornelius Corbett of Detroit.

Telephone Company Scores in South Carolina Rate Case

THE special master has recently made a most complete report in this case to the United States District Court for the Southern District of South Carolina.

Proceedings were instituted by the Southern Bell Company against the Railroad Commission of South Carolina and the States Attorney General to secure relief from an act of the General Assembly of South Carolina approved April 8th, 1922, prohibiting telephone companies from charging rates in excess of those on file with the commission January 1st, 1922.

The telephone company prayed the court to declare this act of Legislature to be unconstitutional, null and void on the ground that the rates required by the Legislature are unreasonable and confiscatory.

The act of the Legislature had the effect of abrogating the commission's order of March 24th, 1921, approving increases over the schedule of rates established for the company during the Government administration of telephone service and continued in effect by order of the Commission.

Shortly after the passage of this act and its approval by the Governor, the Southern Bell applied for an injunction. After a hearing the court granted a temporary restraining order and thereafter referred the issues of the case to a special master for investigation.

In determining the value of the property of the Southern Bell Company in the state used in intrastate business, the master has adhered to the replacement cost less depreciation method, which he regards as the "nearest and fairest system that can be adopted to arrive at the present value of a public utility plant" as the decisions of the Supreme Court and other courts in the United States have not laid down any regular rule by which such findings of value can be measured.

Having determined a method of ascertaining a fair value for the property, the report says:

"The making of a just return for the use of the property involves the recognition of its fair value if it be more than its cost. The property is held in private ownership and it is that property and not the original cost of it, of which the owner may not be deprived without due process of law."

The report also says: "Under all the facts and circumstances of this case the complainant's net income should be eight per cent. upon the value of its property devoted to the public service in this state."

An Open Road in Radio

THE Radio Corporation of America has published in pamphlet form, the address made recently by David Sarnoff, Vice President and General Manager of the Radio Corporation of America to the Electrical Supply Jobbers Association in New York, which contains much to interest and encourage radio addicts, as well as all others concerned.

In very clear and readable English, Mr. Sarnoff tells about the improvement of broadcasting and what is being done toward still further improvement; about super-power stations that are being planned; about the general patent situation, and about the anticipated sales of apparatus and equipment in the near future.

He points out that during the past year, broadcasting has improved considerably, better programmes have been provided and more powerful stations erected and operated, and that receiving sets have also been made better.

He expresses the opinion that a standard line of apparatus has been arrived at "capable of meeting the requirements and even the *desires*" of the average human being, but does not mean to imply that the present receiver has reached the point of perfection. In this connection we would remark that to produce receiving apparatus to meet the "desires of the average human being,"—who, if he happens to be at the same time a radio addict, is, according to our observation almost incredibly stupid, clumsy and unreasonable:—To attempt to meet the desires of the average human being is a very ambitious attempt. The very conception of such an undertaking is creditable to the imagination of the young gentlemen, of whom Mr. Sarnoff is one, who have, by dint of almost unprecedented persistance and courage of conviction, developed the Radio to its present state of efficiency and marvelous universality.

And it is equally commendable humility that prompts Mr. Sarnoff to confess in the same breath that perfection has not yet been attained. In this he will find himself in agreement with a great many thousands of his fellow citizens whose ears have been harrassed and nerves unstrung by the demoniacal howls and screams that emanate from the usual little box containing the mysterious assemblage of coils, lamps, ("tubes") condensers, "and etc.,"—not to mention the discordant, inharmonious sounds that the mellifluous voices of the announcers inform listeners-in is "charming" music (!)

Nevertheless, Mr. Sarnoff goes on to predict, unhesitating, betterments both in transmission and reception that he expects to be forthcoming soon. Let us hope that he will prove to have been a true prophet, and that we may all live to hear it.

One thing that he announces will be hailed with delight by all radio fans: and that is a practicable device enabling the household electric light current to be substituted for the present troublesome and costly battery cells. In connection with this he consoles the battery manufacturers by reminding

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em that their field will be in the portable sets—hich may or may not be comforting to them and ie users of such sets.

But, however, little or much of encouragement or omfort the radio fans and battery people may nd in Mr. Sarnoff's dictum, the supply houses and nareholders, to say nothing of the income tax col-ctors should be overwhelmed with joy.

Mr. Sarnoff went on to say regarding the busi-ess as a whole that this year's figures are larger han last year and believes that the figures for adio this year will amount to about $300,000,000.

(We are not acquainted with any one who is cap-ble of comprehending the meaning of so consider-ble a sum of money unless it be Mr. Rockefeller, Mr. Morgan, or General Dawes, or Secretary Hoover.)

The AGE also is encouraged and made joyful by this prediction, for we always rejoice in the pros-perity of anybody who can be classed among tele-graphers:—and we allow ourselves to hope that we too may share in this $300,000,000, because we have space to sell to all advertisers of all electrical apparatus and equipment, most of whom as it hap-pens, are our personal friends as well as patrons.

On the whole, therefore, Mr. Sarnoff's speech sounds good to us and we trust he will permit us to congratulate him upon it:—which we do very heartily.

Broadcasting from the Zoo

THE WALRUS WENT TO SLEEP

WIRELESS enthusiasts throughout the country were able on October 3rd to listen to the noises made by various animals at the Zoological Gardens, London. They could not of course see how the entertain-ment was produced, but a Central News represen-tative who was at the Zoological Gardens describes what happened there. The broadcasters pushing a microphone on a small vehicle much like a baby's perambulator walked from cage to cage and by various devices and with varying success induced the animals to make their characteristic noises. The first halt was made in front of the cage of the laughing jackass. His feeding time had been put back, and although most people think it no laugh-ing matter to be obliged to wait hours for dinner, the jackass when he saw tempting morsels of food dangled outside the bars of his cage, laughed tre-mendously. A move was then made to the sea lions who barked in a most satisfactory manner, and one was induced to climb to the top of the 'island' in the cage the hope being that he would dive and enable the noise of the splash to be broadcast. Instead of diving, however, the sea lion slid quietly into the water. The laughing hyena laughed in most con-tagious fashion, but the last halt in front of the walrus cage provided a disappointment. The wal-rus, when he saw the microphone grunted twice and then went to sleep.

Placing Radio on the Map of the World

P. C. KULLMAN & Co., the radio brokers of 110-116 Nassau Street, New York, have issued the fol-lowing circular:

TO THE GOVERNMENT OFFICIALS IN CHARGE OF WIRELESS TELEGRAPHY AND RADIO TELE-PHONY THE WORLD OVER

This is the twelfth of a series of circulars, de-scribing, with the accompanying enclosure, the phe-nomenal growth and gigantic expansion of Radio Telephony in the United States of America.

RADIO SECTION OF THE NEW YORK TELEGRAM-EVENING MAIL.

We enclose a copy of the Radio Section of the New York Telegram-Evening Mail, issued every Saturday as a supplement with this paper. This is one of the large group of the Frank A. Munsey Newspapers in the United States of America, which papers are known the world over, wherever the English language is spoken.

The New York Telegram-Evening Mail how-ever is only one of 1000 similar newspapers in the United States, which either issue Separate Radio Sections with their regular newspapers or issue full pages of sections about Radio with Radio Pro-grams. Such is Radio in the United States of America today.

400,000 CIRCULATION.

The enclosed card from the Advertising depart-ment of "Radio News" (circulation 400,000) is only one of the periodical pieces of propaganda literature, mailed by the Experimenter Publishing Company, the publishers of "Radio News," to call attention to the tremendous gain of advertising in the columns of this fast growing Radio publication, "Radio News" now having reached the tremendous circulation of 400,000 copies per month—or Five Million copies a year.

AND "RADIO NEWS" WEIGHS ONE POUND.

"Radio News" is only one of the hundred simi-lar publications in the United States, but it demon-strates better than any other the gigantic propor-tions to which the Radio industry has grown under the liberal administration of Hon. Herbert S. Hoover, Department of Commerce, Bureau of Nav-igation, of the United States Government, govern-ing Radio communications, Radio reception and the manufacturing of Radio apparatuses.

WE APPEAL TO YOU.

To you as a Government Official of your Coun-try this advertising card is respectfully submitted as an evidence of the steady growth and expansion of Radio. Radio is not only a public utility but is a source of information, pleasure and enjoyment to millions of people.

BROADCASTING COVERS THE UNITED STATES.

On Friday, September 12th, 1924, the Army De-partment of the United States Government, with the aid of the American Telephone & Telegraph Company and the Radio Corporation of America, gave a practical demonstration of Radio Broadcast-

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ing in which Secretary of War Weeks; General John J. Pershing, Chief of Staff; J. J. Carty, Chief Engineer of the American Telephone and Telegraph Company and a large number of others in Washington; General Bullard at Governors Island, New York (225 miles distant), General Hale at Chicago, Illinois (947 miles distant), General Duncan at Omaha, Nebraska (1443 miles distant), General Morton at San Francisco, California (3321 miles from New York), were all enabled to address by means of Radio Broadcasting a Radio audience of more than 25 million people, reaching every corner of the United States, except Alaska, and the outlying islands, but including even vast stretches of the Pacific and Atlantic Oceans, and the Great Lakes, where passengers and crews on steamers, in possession of Radio Receiving Sets, could listen to those very addresses whether from Washington or from New York; or from Chicago, or from Omaha or from San Francisco.

LONG DISTANCE TELEPHONE COMMUNICATION.

The following long distance telephone stations reported to Washington in the line-up: Harrisburg, Pa. (196 miles), Pittsburgh, Pa. (404 miles), Beaver Dam, Iowa (652 miles), Chicago, Ill. (974 miles) Davenport, Iowa (1123 miles), Omaha, Nebr. (1443 miles), North Platte (1754 miles), Denver, Colo. (2029 miles), Rawlins, Wyo. (2304 miles), Salt Lake City, Utah (2607 miles), Winnemucca, Nev. (2918 miles), Sacramento, Calif. (3221 miles), and San Francisco, Calif. (3321 miles).

18 STATIONS "LINKED TOGETHER."

By means of an elaborate wire system, Broadcasting Stations in Boston, Mass.; Providence, R. I.; New York; Schenectady, N. Y.; Buffalo, N. Y.; Pittsburgh, Pa.; Philadelphia, Pa.; Atlanta, Ga.; Washington, D. C.; Cincinnati, Ohio; Chicago, Ill.; St. Louis, Mo.; Kansas City, Mo.; Minneapolis, Minn.; Omaha, Nebr.; Dallas, Tex.; Oakland Calif., and Denver, Colo., were "hooked up" and "linked together" by these very means of a network of telephone wires.

38,000 MILES OF WIRE.

Broadcasting circuits covered in the "hook up" 7,057 miles; emergency wire circuit 7,430 miles; back-talk circuit 3,510 miles, second talking-back circuit 1,152 miles, and a total of 38,000 miles of telephone wires were employed. This includes the ranges of the broadcasting wave lengths of the above-mentioned 18 Broadcasting Stations.

THE FUTURE OF EUROPE.

When Europe and the rest of the World will have attained that efficiency in Radio Telephony; which we now possess and so happily enjoy in the United States of America, the Marconi's Wireless Telegraph Company, Limited and its associated and affiliated Companies can furnish the means to the British Empire and the Governments of other Countries and Nations on the face of the Globe, to enable their Monarchs and Rulers and Prime Ministers to address at One time All their Subjects and All their people with One voice as distinct and as clearly as if the Speaker was standing right opposite them within a few feet distance.

THE SUCCESSFUL TEST IN THE UNITED STATES.

This is not a prophesy, but it is a fact, actually obtained and demonstrated on September 12, 1924, by the Army Department of the United States of America with the aid of the American Electrical Communication and American Radio Broadcasting on September 12, 1924, when more than twenty-five million American people have "listened-in" on the millions of Radio instruments in their homes, on the farms and in the work shops and factories on the American continent as well as in the cabins and staterooms of the steamers and yachts on its inland lakes and adjacent oceans.

That is Radio in the United States of America.

What can you do to make radio popular in your country?

Will you help us to put radio on the map of the world?

Origin of Broadcasting by Radio Telephony

THERE is a debate going the rounds of the radio press with the idea of establishing whether Harold J. Power, Frank Conrad or H. P. Davis was the first to set up scheduled broadcasting.

From the scientific standpoint scheduled broadcasting bears about the same relation to radio telephony as the Associated Press bears to the invention of the telegraph.

Some of the facts are: In 1906 R. A. Fessenden telephoned by radio a distance of eleven miles. In 1907 Lee De Forest transmitted phonograph music by radio, and in 1908-09 broadcasted music from the Metropolitan Opera House, New York. On September 29, 1915, the United States Navy Department and the American Telephone and Telegraph Company, co-operating, telephoned by radio from Washington, D. C., to Honolulu, Hawaii. In November, 1916, election returns were broadcast from the De Forest laboratory, Highbridge, N. Y., and on December 30, that year, the same station radioed music for a dance held in Morristown, N. J.

Harold J. Power, at Medford Hillside, Mass., broadcasted music two or three evenings weekly beginning in December, 1916, and on May 20, 1921, began daily broadcasting from station WGI.

In the fall of 1919, De Forest, C. V. Logwood and R. F. Gowen gave radio amateurs in the vicinity of New York nightly demonstrations of radio music. On October 17, 1919, Frank Conrad, at Wilkinsburg, Pa., experimented with broadcasting, which tests grew into and brought into being station KDKA at Pittsburgh, on December 23, 1920. Station WJZ, Newark, N. J., was opened on October 3, 1921.

The list of pioneers of the radiophone is a long one and although broadcasting on a large scale dates from the fall of 1921, the fact remains that the art was under development continuously since 1906.

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Fifty Miles From Nowhere

By W. Lee Dickson.

(Continued from page 492, November 1st, issue)

The last fear of the last doubter was dispelled before the final chord. The men burst into uncontrolled cheering. Here was one they had always needed! They swarmed about him; and a dozen requests for this and that favorite mingled with their praises. He sang again—then again, as their enthusiasm mounted: army ditties, and they laughed; songs of the Mason-Dixon line, and they listened, rapt. Midnight passed. They made him repeat "On the Road to Mandalay" and lustily joined in the choruses.

They were rollicking through the last chorus when the door sprung open, shocking them into silence, and a tall, keen figure in oilskins stood glowering on the threshold. The intruder, one hand on the door, had already singled out Jerry, whose banjo dropped to his knees, and in whose ears rang premonitory whispers: "The Old Man!"

The superintendent strode into the room. "Who," he demanded, "are the midnight relief?" Twenty-odd operators rose diffidently, abashed. "Then why in hell aren't you in the office?" he rasped. There was a scurrying and much consulting of watches. The newcomer interrupted. "No need of that! It's twelve-twenty. The married men relieve on time; you fellows seem to think—"

The diatribe was drowned by the guilty ones crowding out into the rain, breaking into a run for the office. A voice, richly cockney, called back from the road: "We're bloomin' naughty boys, eyen't we, teacher dear?" Then some highly profane advice; and laughter died with their footsteps.

Those remaining kept silence, awaiting the scene they knew must follow. They were not disappointed. Stepping up to Jerry, Mr. Jessup blared: "And who the devil are *you?*"

Jerry smiled. "Jerome Martin, sir."

"What're you doing here?"

"I'm a new operator, sir."

Mr. Jessup knew the dramatic value of a pause. He contemplated the banjo, wagged his head, looked Jerry up and down; then, with fine sarcasm: "So you're the new operator! Well, well! You seem more like a music-hall entertainer, Mr. Martin. You see, it's a custom for new men to present their papers and be assigned to duty before they delay the regulars from their work." He added sharply, "Report to me in the morning!" and was gone.

There were sympathy for Jerry, slaps on the back, and the information that the Old Man was a thundering grouch, a glutton for discipline. There was assurance that his ire would abate by morning and, on the strength of it, requests for more entertaining. But Jerry declined. The song had been taken out of him, or he was very tired. He said he thought he'd "just turn in," and went next door and climbed to his room.

This chamber was small and nearly bare. An iron cot, a chair and a table were its furnishings. One window, heavy with rain, looked off to the bay and the sea beyond. Jerry tried to peer out into the teeming darkness, but it was useless.

He opened the window, switched off the light, and climbed into bed. Rain, unceasing rain; and beyond and through it the monotonous, empty cadence of surf—somewhere; and somwhere else the dismal measured croak of a foghorn: an untiring trio sounding a minor chord of loneliness. Jerry filled and occupied with gum. Gum-chewing was thoughts of his aunt; memories of those wonderful days in London; then sleep—and cool fingers that stroked his hair in the grounds of a certain hospital.

Jerry was roused by a determined bang on his door, which concurrently swung open. He blinked over the edge of his covers to behold a stocky individual, somewhere in his officious thirties, standing at the foot of his bed: the bellicose Hornby. His outstanding characteristics were a cap, very partial to his left ear, and a mouth completely filled and occupied with gum. Gum-chewing was never an English trait; but some there were who learned it during the war. This man, mused Jerry, must certainly be its most enthusiastic convert. Surveying Jerry, Hornby's little eyes narrowed nearly to closing, as though blinded by this luxurious lolling. The Sybarite smiled through a yawn. "Er—g'morning! Who're you?"

An unpleasant voice struggled through the chewing process. "I'm *Mr.* Hornby, chief supervisor. You should have turned out an hour ago; Mr. Jessup's been waiting for you to report. We haven't even seen your papers yet. For a man that was in the army, as they tell me you were, you ought to know—"

"Oh, say! Hornby—" Jerry began, sitting up.

"*Mr.* Hornby to you! I'm next to Mr. Jessup here and I rate that. Now, you're starting wrong, young fellow. You won't have time to eat now: it's seven-thirty. Get into your clothes and relieve on the London Morse at eight."

"How about seeing the Old Man? He told me—"

"If you mean Mr. Jessup, you'll have time enough to see him! Give me your papers and I'll tell him you were asleep."

Jerry felt reasonably sure that he would. He produced his papers. Hornby glanced through them briefly, turned and departed.

A bar of chocolate served as breakfast; and Jerry marched out into the morning, dull and wet from the night's rain. He glimpsed the bay, leaden and ugly, restive under the low cliffs. His leg bothered him a bit in wet weather, and he limped ever so slightly. He looked toward the Cahirciveen road, inundated, deserted. "A nice, cheerful little place ,Mr. Martin" he told himself and reported at the office with the new relief. Friends of the night before introduced him effusively to men he hadn't met. They were a good crowd, Jerry pondered. But his lot at the station, or his hope of transfer, was in the hands of the omnipotent Jessup and Hornby. And these had promised to be chary enough of favors.

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A telegraph key is just that, no matter where it is; and coded messages are just as meaningless in Ireland as in France. There was, however, this difference: here there was no respite. The incoming cables were piled before him faster than he could relay them. Hornby hovered near his chair. When the men were relieved for lunch, there was no relief for Jerry. This was seen to by Hornby. There was a hollow explanation about wanting him to "get used to the key." The last two hours were a trial. He was very hungry, and his arm and fingers ached; but any slackening elicited a grunt through the furious munching behind him. He carried on until the four o'clock men took up the burden. Rising—rather weak, but smiling—he confronted Hornby. "How did I do, sir?" The reply, as nearly as Jerry could judge, was "Gr-m-m"; but it was not reproval, so his work must have been good. He knew the Hornby type: there had been top-sergeants.

The thought of food was paramount. He was being directed, when a gentle person passing middle age came out of the crowd and extended his hand. "My boy," said this man, "my name is Disbrow. The men told me about you; last night, I mean." He smiled. "That was too bad, but Mr. Jessup is that way. I wish you'd come over to my little place. My wife will find something for you. Won't you come, please?"

The man's smile was repressed and sad. His eyes were palpably honest. His invitation was tinged with something of longing to have Jerry accompany him. When Jerry consented, his face lighted and he said, "Oh, fine, fine!" and eagerly took the boy's arm.

He lived in one of the standard little houses allotted men with wives. He urged Jerry into the one comfortable chair in the living-room cluttered with books and cheap ornaments. He pushed some cigarettes at him then left the room. Voices came from what must have been the kitchen. Then Disbrow returned, and drew up a chair, facing him.

"Mrs. Disbrow will have something for you right away. Tell me, son: what part of the States are you from?"

"Cleveland, Ohio," Jerry told him. "Do you know anything about America?"

Disbrow smiled and looked away: the weary smile and far look of somber retrospection. Slowly he said: "I was born and raised in Maryland."

Jerry impulsively grasped the older man's hand. "Say!" he cried. "We're the only Yankees on the ground! We'll have to stick together, eh?"

Disbrow's eyes were suddenly moist; and as suddenly he determined on saving something. He placed one hand on Jerry's shoulder. "No," he said; "we'll not stick together, Martin. You've got to get out of here as fast as you can."

This was uttered so calmly that Jerry looked at him, groping. "I—I don't understand, sir—"

"I mean that you shall—and now. You're young; and at your age youth seems an immortal thing; endless years seem to lie ahead. You haven't found yourself yet. Very well. But get out of the cables before you grow accustomed to the job, get lazy in it, and start the putting-off process. It only takes a little while; I *know*! I'm one who joined 'for a little while, to see the world.' But year after year I put off getting out. It's lazy work, this, and these God-forsaken stations—they're all alike—are soul-devouring. The routine shackles your mind as it does your body. Like many others, I married—a native girl, here. Loneliness, my boy—ah, well, never mind that. But look at *me* Martin. I'm well born I'm well read; but I'm not a damned bit better than one of those receiving-machines. It's too late now; I don't know anything else. But you—you put in your resignation. Get out!"

The man's intensity, one hand gripping Jerry's knee till it pained him, left him speechless.

A new depression came upon him after leaving the house. He went to his room and gazed out on the bay. Could he, too, fall in that rut? Would he some day be as old as Disbrow? There was sudden desire to leave this place, to desert, to find work, any kind ,anywhere but here. Feeling himself sinking he turned to an unfailing source of cheer—the banjo. But not here; it would bring a crowd upon him, and he wanted to be alone.

The afternoon had cleared, and a dull sun was pendent over the sea. He went out, case in hand, away from the buildings to the shore, and along the edge of the bay. The massive hills that walled the station were grimly beautiful in the fading October light; but they were walls, imprisoning, austere. Disbrow's words still rung in his ears. He walked to where a hog's-back projected into the water. Its farther side was sloping, forming a ledge hidden from the buildings, facing the sea. Beyond—somewhere—America; all his "buddies"; opportunities; New York, that he had never seen. He sat on a rock, propped himself against another, and strummed familiar chords. Then, inappropriately enough, he sang "I've been working on a railroad." He laughed when he realized it might be months before he'd even see a railroad. But he was cheered by his own song and repeated it, embellished with certain distracting harmonies. He finished with the inevitable "And she lives down in our al-lee!" of the army. He felt much better. He was about to continue this curl when a voice, startingly near and terribly unexpected, said: "That's ripping, Jerry. Didn't know you could do it!"

He turned; then bounded to his feet. One word escaped his lips: "Jo!" And then, almost a cry, "Jo!"

She stood on a rock just above him, a picture of radiant twenty, clear-eyed and laughing. A gentle breeze ruffled the blue dress she wore and lifted the front of a drooping blue hat from her face. She was bewitching on these rocks as any siren who lured Ulysses. She was, indeed, less real to Jerry. He looked—as she always and tenderly remembered it—consummately foolish.

She stepped down to him, both hands extended. "Jerry!" she said. "Oh, I *am* glad to see you!"

"Lord!" he began; then: "I didn't expect to—to see *you*, Jo!"

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"You've never even thought of me! You didn't ven say good-by, at the hospital."

"Oh, say, now!" he objected. "You were on eave. And I *have* thought of you, Jo—honestly I ave."

The woman of her: "When did you think of ne?"

"Why—why, lots of times; only last night—"

She rescued him. "Tell me about yourself. How's he bad leg? And what on earth are you doing here?"

He told her; briefly, naively. She listened, nodding encouragement. When he finished, he looked at her again, and a sudden fear struck within him. Was she in one of those Disbrow houses? "Jo," he said quickly, "Jo, you aren't—married—or anything, are you?" His expression made her laugh; and the laugh dispelled his fears. Then they both laughed—rather foolishly and long.

His thoughts raced ahead; out and past the loneliness that had been this place, to the hope of hours with Jo. Jo refound! Here was a new station, on a new bay, in a new world! Boyishly he asked: "Can't I see you—say, this evening, Jo?" Her face clouded, her lips compressed, and slowly she shook her head. Unguardedly he pressed "Why?" Then frankly she told him.

"Jerry, I'd just better out with it now. Father's the superintendent here, you know—"

Jerry gasped. "Mr. *Jessup?*"

"Why, didn't you know?" she said. "But of course how could you? You never knew my last name. But you needn't look so horrified about it, Jerry. Well, father's a bit peculiar about allowing the operators to come to the house, and—please don't be hurt—he doesn't like me to see them—ever. It's not being unkind; it's just discipline, he says."

Mr. Jessup—the Old Man! Jerry looked across the darkening water. "I think I see," he said unhappily. Aladdin had snatched back his lamp.

She put out one hand, instinctively to touch him; but drew it back. "Jerry," she said, " if you take my advice, you won't stay here, at the cables. You'll get out." There it was again. He turned rather churlishly. I've heard that before," he said. "Perhaps I will!"

When next she spoke her voice was as he remembered it, at the hospital: gentle, but commanding. "Jerry Martin, look at me." He obeyed with something of pouting. "Jerry, I told you I'm glad you came, and I am—more than you know. Do you really want to see me?"

"Jo!" His face and one gesture made the syllable eloquent.

"Then you shall," she told him. He bent toward her, already committed to any conspiracy, any risk. "Down here afternoons, like this. I—I always stroll down this way anyhow, and—and I want to talk to you, Jerry. I—I'm not very happy," she added, unguardedly.

Clumsily he would have asked questions. She sensed this and rose quickly, giving him both her hands again. "And tomorrow you must play for me, please. Tomorrow, Jerry."

He watched her disappear beyond the ledge.

As he tramped back to the station, a confusion of emotions possessed him—made him giddy. As to finding Jo again—and here of all places!—it brought poignant realization that he had never ceased looking for her. But Jo as Miss Jessup, daughter of Old Man Jessup, and her use of Disbrow's very words, her hint of unhappiness—these were too much to digest on top of the surprise of finding her. The very buildings seemed changed.

He went through mess in a polite daze.

The bellicose Hornby, ubiquitous as trouble, and closely affiliated with it in Jerry's mind, stopped him at the shadow, outside the mess-hall, on his way to his room. "A word with you, Martin!" was the beginning, through unrelenting chews, and the tone promised unpleasantness, a promise which Hornby fulfilled immediately. "You were down the beach this afternoon, weren't you?" This was put as an accusation, not as a question.

"I was," answered Jerry . Then, reaching in his pocket: "Have a new piece of gum?"

Hornby pushed his arm aside. "Not yours, thanks! What were you doing down the beach—huh?"

Jerry paused. As mentioned, he knew the Hornby type; but that was in the army, and there are courts-martial in the army for certain impulsive acts.

"I said, what were you doing down the beach? Are you deaf?"

"What do you think I was doing—building a battleship?"

"No impertinence! Answer me!"

Jerry tried placating. "See here, Hornby—" But it was no use.

"*Mr.* Hornby to you!"

Jerry flared. "Mr. Hornby—hell! That goes on duty, but out here you're Hornby and I'm Martin! Now, what d'you want to know?"

Hornby gulped, endangering his entire respiratory system. But he recovered quickly. He'd show this pup—and now. He assigned the great wad to one cheek and began. "I'll tell you what I want to know! What do you mean by sneaking down the beach with that damned banjo of yours and—"

"Excuse me" Jerry interrupted. "I didn't sneak and, as you asked, I'm not deaf."

"Shut up! Er—and then trying to make up to Mr. Jessup's daughter. I saw you!"

"How did you see us?"

"Never mind! I was down that way myself." Then a revealing addition: "I knew she'd be there."

"So you were peeping," Jerry prodded. "Well, how did we look?"

"See here! Miss Jessup and I are good friends, understand? You're not to see her again. She's not one of these girls you army chaps can put on a lot of swank with and—"

(To be continued)

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EDITORIAL COMMENT

Dedicated to the Memory of the Old Time Telegraphers of the Past and Future

By J. A. McIntyre
St. Louis, Mo.

When our country began to expand and grow,
In the pioneer days of many years ago,
And armies of civilization were pushing their way
Into the wilderness of savages and beasts of prey,
Building railroads and telegraph lines to the Golden West
Old Time telegraphers faced death with the rest.
Working the wires and helped to blaze the way
For the great railway and telegraph systems of today.
In the Civil War of 1861,
When brother fought brother and father fought son,
As military telegraphers Old Timers were in the fray.
Some wore the blue and some wore the gray.
And on each side fought bravely and died
On the battle-field, often falling side by side.
But when the war ended and peace was made,
All were united again and our country saved.

When Spain attacked our country, in ninety-eight,
And volunteers rallied around our flag from every state,
From North and South, East and West
The Old Time Telegraphers volunteered with the rest.
And in the military corps on sea and land
Helped to defeat the enemy on every hand
Until they were routed and, in hasty retreat,
They left our shores acknowledging defeat.

When America entered the World War, seven years ago,
To protect our flag and American lives from foreign foes,
Old Time Telegraphers rallied to the colors once more,
As they did in the days of yore;
And so may it be to the end of time,
May they always respond and fall in line
That the Star Spangled Banner may continue to wave
O'er the Land of the Free and the Home of the Brave.

Awards for Radio Invention

The Institute of Radio Engineers has two awards which are made annually in recognition of meritorious achievement in radio development.

One of these is a large gold medal, awarded by the Institute, which, so far, has been awarded to E. H. Armstrong, E. F. W. Alexanderson, G. Marconi, R. A. Fessenden, Lee De Forest, John Stone and M. I. Pupin.

The other award is that known as the Liebmann Memorial Prize, consisting of the sum of five hundred dollars in cash. This prize has been given to the following: R. A. Weagant, L. F. Fuller, R. A. Heising, C. S. Franklin and H. H. Beverage. For the year 1924, this prize has just been awarded to John R. Carson, of the American Telephone and Telegraph Company, New York.

These awards are made by the Board of Direction of the Institute. This year the members of the Board are: J. H. Morecroft, J. H. Dellinger, J. V. L. Hogan, Donald McNicol, Lloyd Espenschied, A. H. Grebe, W. F. Hubley, A. N. Goldsmith, Melville Eastham, A. E. Reoch, Edward Bennett, L. A. Hazeltine and H. W. Nichols.

Eighteen Radio Studios Linked on Defense Day

In the nationwide celebration of Defense Day under the auspices of the Army authorities, 19,000 miles of telephone wire were connected with eighteen broadcasting stations to make possible the greatest national broadcasting event on record. The nation's lines of communication were also tested when the widely separated army corps centers of the country were linked with their headquarters in Washington.

At 9.15 P. M., Eastern Standard time, Major General C. M. Saltzman, the Chief Signal Officer of the Army, was introduced by the announcer of WCAP. He was followed by Secretary of War John W. Weeks and by General John J. Pershing. Then came General John J. Carty of the Officers Reserve Corps, under whose direction the demonstration of the Long Lines telephone facilities was given. He called the roll of the Army centers and reports were received from Major General Robert Lee Bullard in New York, Major General Harry C. Hale in Chicago, Major General George B. Duncan in Omaha, and Major General George C. Morton in San Francisco.

Ordinarily, in connecting broadcasting stations together, transmission is merely one way, that is, outward from the point at which the program is rendered, but in this case each radio station heard the various speakers by way of Washington. When Major General Morton in San Francisco talked into the transmitter, his words were not carried directly to station KGO, just the bay in Oakland, but first went to Washington and then came back, making a total journey of 7,000 miles before reaching KGO.

The stations participating were: WCAP, Washington; WEAF, New York; WOO, Philadelphia; WJAR, Providence; WNAC, Boston; WGY, Schenectady; WGR, Buffalo; KDKA, Pittsburgh; WLW, Cincinnati; WGN, Chicago; WLAG, Minneapolis; KSD, St. Louis; WDAF, Kansas City; WOAW, Omaha; KLZ, Denver; KGO, Oakland; WSD, Atlanta; WFAA, Dallas.

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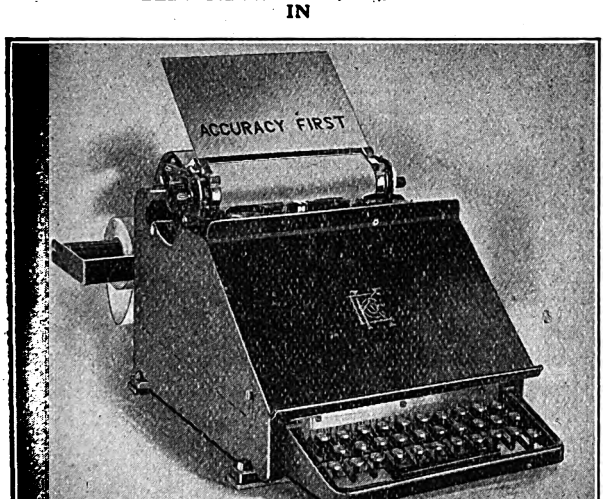
THE KLEINSCHMIDT
TELEGRAPH TYPEWRITER
AN ENTIRE SYSTEM
IN



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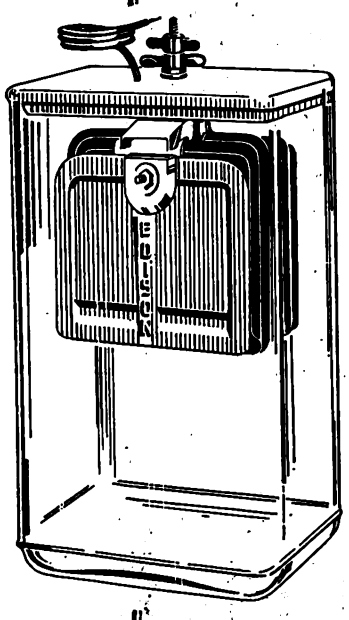

EDISON PRIMARY BATTERIES
for Telephone Service

There undoubtedly is a very good reason why such representative railroads as the Pennsylvania System, the New York Central Lines, the Lackawanna and others are using so many Edison Primary Cells on dispatcher's transmitters, and in other classes of telephone service.

We shall be glad of the opportunity to demonstrate to anyone interested why they have found them so satisfactory and economical.

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

THE Committee of Direction held a meeting in icago on October 22nd when it selected New leans as the next place for the annual meeting, tober 20th, 21st and 22nd, 1925, being the dates. ose present were: G. D. Hood, Chicago; H. A. epard, New Haven, Conn; I. C. Forshee, Philalphia; R. F. Finley, Cleveland, Ohio; W. P. ine, Wilmington, N. C.; E. E. Dildine, St. Paul, inn.; P. F. Frenzer, Omaha, Nebr., and J. C. hnson, Philadelphia.

Committee No. 11—Communication and Transssion will hold a meeting in New York City on iday, November 21st.

A meeting of a special committee on System Coding Wireless and Cables held a meeting on ctober 29th at which time they considered a scheme code numbers for wireless and cables for which ecifications have been prepared, at which were resent W. S. Stewart, M. R. Greenamyer, J. L. iesse and H. W. Drake.

W. W. Atterbury to be President of Pennsylvania Railroad

W. W. ATTERBURY is being groomed to assume he presidency of the Pennsylvania Railroad when amuel Rea relinquishes that office next September y virtue of having reached the company's seventyear age limit.

Committee of Prominent Engineers

THE Board of Examiners, American Institute of Electrical Engineers, is made up of nine Fellows of the Institute, its duties consisting of passing upon all applications for transfer of grade of membership and for admission to membership in the Institute.

The membership of the committee for the term ending in 1924 included the presidents of three national societies: J. H. Morecroft, president of the Institute of Radio Engineers; F. M. Farmer, president of the Society for Testing Materials, and Erich Hausmann, president of the New York Electrical Society. Other members of the Board are: H. H. Norris, Edward Bennett, E. H. Everit, F. V. Megalhaes, Donald McNicol and N. L. Pollard.

The Board continues from year to year, with only occasional changes in personnel.

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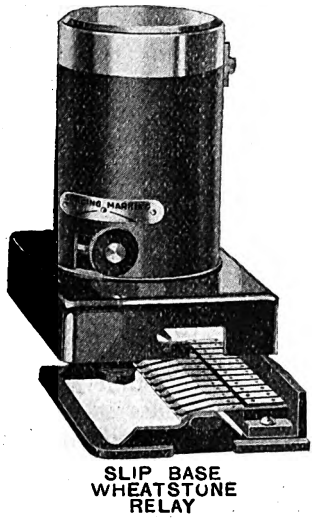
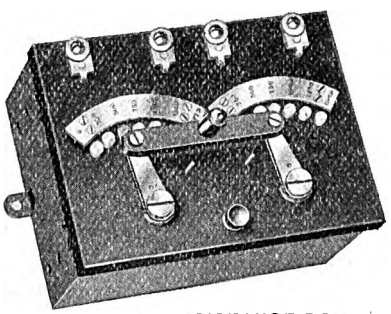
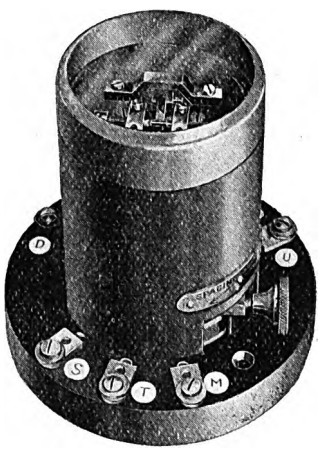

SLIP BASE WHEATSTONE RELAY


ADDED LINE RESISTANCE BOX

JACKS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The Forty-first Reunion of the Old Time Telegraphers' and Historical Association and the Society the United States Military Telegraph Corps, Held at New Orleans, La.

It's nearly fifty years ago that they organized. But you'd never think it from the life and spirit that marked the convention of the Old Time Telegraphers' and Historical Association and the Society of the United States Military Telegraph Corps held in New Orleans.

Friday was a day for play and sightseeing at the convention. There had been work, Thursday, Election of officers and selection of New York for the next convention, and a mass of detailed business and no end of reminiscences. But Friday saw all that stuff shoved to one side. It was time to play. Starting at 10 a. m., from the lobby of the Roosevelt hotel, which was headquarters for the convention, the Old Timers went by special train to West End where they boarded the Susquehanna and steamed forth on Lake Ponchartrain, through the Industrial Canal and Inner Harbor, out through the locks into the Mississippi River, and then up and down the harbor of America's second greatest port. A Hallowe'en party, buffet luncheon and dancing on board enlivened the day's program, and it was a live, live program at that.

Thursday, as aforesaid, held business. Richard E. Enright of New York, police commissioner of the world's greatest city, was elected president of the Old Timers to succeed F. A. Mohr of Dallas, who has been entrusted with the famous daguerreotype of S. F. B. Morse, father of the telegraph —the daguerreotype that is the most treasured possession of the association.

Other officers elected for the coming year were, vice-presidents Newcomb Carlton, president of the Western Union Telegraph Company of New York; F. F. Fitzpatrick, president of the Railway Steel Spring Company of New York; General J. G. Harbord, president of the Radio Corporation of America; Clarence H. Mackay, president of the Postal Telegraph Cable Company; J. L. Merrill, president of All-America Cables, Inc.

Thomas E. Fleming of New York, was re-elected secretary-treasurer. John B. Taltavall, publisher of the Telegraph and Telephone Age, was elected historian. Frank J. Scherrer of New York, was re-elected auditor.

Then they went on a long automobile ride around the city Thursday afternoon, stopped for tea at the Patio, and gathered for vaudeville and a dance at the Gold room of the Roosevelt Thursday night.

They were indefatigable, those old-timers. You glimpsed in them the energy of the young Americans of one and two generations ago, who pioneered into the wilderness of a wild, new country, and the wilderness of a wild, new profession.

And you saw, as you studied their faces and their records of achievement, something of the caliber of those old-time knights of the clicking key. For they are Men. And they are Men still.

There were men who started as penniless youths with their ambition and their health and their knowledge of Morse their only assets in life, and who have risen to the management and ownership of properties that rate into the millions.

There were men who have seen history—and helped to make history.

Take such a man as David Homer Bates. There's a true veteran of the key. He started as office boy for Andrew Carnegie. And he it was, in his 'teens, who was taken by President Abraham Lincoln as the President's confidential telegraph operator throughout the Civil War.

That was the youth who was in constant touch with such men as General Winfield Scott, with Generals McClellan, Burnside, Huger, Meade and U. S. Grant. And Thursday he told of the abounding humor of the man who had so heavy a weight to bear upon his gaunt shoulders.

While Lincoln lay dying of his assassin's attack it was David Homer Bates who sent out the confidential messages for Edwin H. Stanton, secretary of war, in Lincoln's cabinet. And in New Orleans Thursday Mr. Bates met Louis H. Stanton broker, son of Lincoln's wartime secretary of war. Also he met Miss Ellsworth, descendant of the Colonel Ellsworth of the New York Fire Zuaves, whose death when he was killed in action brought out an immortal letter from the pen of Lincoln.

All these reminiscences Mr. Bates told to the convention in a fascinating address. And he buddied awhile with Robert Ewing, publisher of The States, an old friend, veteran too of the early days at the key.

In his later career David Homer Bates held high office in the telegraph world, and was a veteran of the notable fight in which Jay Gould brought the Vanderbilt interests in the Western Union to their knees in capitulation in the famous merger.

But David Homer Bates was only one of the old-timers there.

Present was E. H. Hogshead, former manager of the telegraph office at Meridian, Miss., the man who is eighty-four years old, and who was the only man at New Orleans convention who attended the 1880 convention in Cincinnati when the Old Timers' first organized. He has come back to New Orleans so as to live to be one hundred, he insists.

Oh, they were men, those old-timers. It is doubtful if from any one other class of workers so many leaders in different lines of endeavor have arisen as from the key.

There is T. D. Lockwood of Boston, retired expert on telephone and telegraph apparatus, author of many technical books on telegraphy and telephony, lecturer on those subjects in many universities today. For years he was the patent attorney for the Bell System interests.

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There was A. W. Towsley, of the Chicago, Rock Island and Pacific Railroad, who came to the convention in his private car, accompanied by Mrs. Towsley, and a party of friends.

From all over the country came, representatives of a membership of more than 2,000.

Two of the very Old Timers residing in New Orleans are T. J. Rogers, eighty-five, and John T. Matthews, eighty.

One of the most popular delegates was John B. Taltavall, the historian, who, though blind, is one of the most talented writers and executives in the business to which he has devoted his life.

There was feasting at the banquet, community singing which demonstrated the Old Timers have vocal accomplishments as well as skill at the key, dancing which showed the veterans of the game can still "shake a mean foot" and many frolic of light-hearted mirth in the day when many of the Old Timers are approaching life's allotted span and all of them can foot up more than twenty-five years of service in the profession.

The operators assembled at 5.30 o'clock for the banquet, at which Col. Robert Ewing, publisher of the New Orleans States but the wielder of a key back in 1871, presided as toastmaster.

"I can't remember," said Colonel Ewing, "when a meeting has stirred within me such memories of the past as has this meeting this week." And that sentiment probably was echoed by his fellow veterans of the wires.

Colonel Ewing introduced T. E. Fleming, the veteran secretary of the organization, who directed the reproduction, on the screen and on the phonograph, of the Old Timers' annual message, sent a few days ago by Harvey D. Reynolds in Buffalo, to Colonel Ewing in New Orleans. The phonograph reproduced the dot-and-dash language of the wires, while trained ears at the banquet instantaneously transmitted it into intelligible English. They have not forgotten the song of the key, those Old Timers, even though many of them have graduated from active work in the profession for many years.

Colonel Ewing read a letter from R. E. Enright, police commissioner of New York, who while not attending this convention, was nevertheless elected president for the ensuing year, the convention for 1925 going to New York City. Also, the following letter from Thomas G. Rapier, for many years the leading figure in the publication of the old Picayune and now retired, was read.

"Mr. Robert Ewing, care of Daily States:

"My Dear Bob: In view of the meeting of the 'Old Time telegraphers; the following items may be of interest. Remember they are the reminiscences of a boy of fourteen and that the facts stated existed sixty odd years ago.

"In April, 1862, the Yankees captured the city of New Orleans, at which time I was a messenger in the telegraph office, which was situated at the corner of St. Charles and Gravier streets. We had sitting in the rear of the office three operators, Frank C. Jones, Matt Flippin and Saville. We were all astonished that they took the messages by sound and did not use the tape. At that time the late John T. Gibbons was a clerk in the office and Luke Evans was the principal receiver. G. Q. C. Davis was the manager and among the messengers were James T. Alleyn (in late years the manager) J. B. Q. Adams, afterwards the cashier.

"There was another telegraph office across the street under the old St. Charles Hotel. In recent years I visited the Operators' Room in New York where there were six hundred men operators employed at one time.

"With every good wish, I am,
"Sincerely your friend,
"THOMAS G. RAPIER."

A narrative of interesting reminiscence prepared by David Homer Bates of New York, and read by William A. Porteous, brought the banqueters back to pre-Civil War days when the telegraph was young but growing fast. Mr. Bates was one of the operators selected by Abraham Lincoln to transmit dispatches during the Civil War. He is one of the few survivors of that band of operators.

Mr. Bates recalled that in the early days operators were training their ears to a metallic tone of the dot-and-dash instead of depending on the recording tape with which the original telegraph was equipped. He remembered that one manager had warned the operators against "receiving by sound," a practice which is now universal. "Do not trust your ears" this manager warned his staff, a caution that would bring a smile to the operator today.

Mr. Bates flashed "73"—which is "regards" in the language of the key to his old comrades.

Judge Rufus E. Foster, federal district judge in New Orleans; T. D. Lockwood of Melrose, Mass., F. A. Mohr of Dallas, retiring president of the association; Mrs. William A. Porteous and Mrs. Mohr, offered brief remarks.

Musical numbers were offered by Dr. J. F. Roach, Mrs. Harold Weingerter and Mrs. H. R. MacLeod, while the Old Timers' love song set the banquet hall ringing with the melodies of old favorites, sung by the assembly. Miss Ruth Moore gave a fancy dance.

The Telegraphers were in session in New Orleans three days, and the entire convention period, outside of one brief business session, was of a social and entertainment character. The following committees were in charge of the proceedings.

Finance—Chas. A. Stair, chairman, W. B. Borey, Wm. A. Porteous, J. G. Hilbert, Frederick W. Ellsworth, treasurer, Chas. A. Weinberger, B. P. Hancock, A. N. Porteous, G. P. Brinkley.

Hotel and transportation—Henry W. Robinson, chairman, L. W. Sauvinet, James Marque, A. A. Cohn, Joseph Holthouse.

Entertainment—Wm. A. Porteous, chairman,

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J. G. Hilbert, B. P. Hancock, James R. Wright.

Publicity—Robt. Ewing, chairman, E. J. Norton, R. J. Blanchard, W. R. Boydell.

Membership—J. F. Wilson, chairman, P. R. Napier, E. H. Jordan, J. P. Rohling, Joseph Meynier, J. M. Waystaff.

Badge—B. P. Hancock, chairman, J. P. Rohling, Tom Steen.

Ladies—Mrs. Frederick A. Mohr, general chairman, Mrs. Wm. A. Porteous, Mrs. Frederick W. Ellsworth, Mrs. Joseph G. Hilbert, Mrs. J. P. Rohling, Mrs. M. L. Pardee, Mrs. Tom Steen, Mrs. Robert Ewing, Mrs. Charles A. Stair, Mrs. George P. Brinkley, Mrs. B. P. Hancock, Mrs. M. L. Feehan, Mrs. Henry W. Robinson, Mrs. Wm. H. Schroeder.

Programme

Thursday, October 30:

9:30 A. M.—Preliminary Gathering, Lobby, The Roosevelt.

10:00 A. M.—Business Session of the Association and U. S. Military Telegraph Corps. Convention Hall, 12th Floor, The Roosevelt.

12:30 P. M.—Luncheon
Gold Room, Mezzanine Floor, The Roosevelt.

2:30 P. M.—Automobile Ride over the City, (Stopping for Tea at Patio) Autos at University Place Entrance, The Roosevelt.

7:30 P. M.—Assemble in Gold Room, The Roosevelt
Vaudeville and Dance. (Informal)

Friday, October 31:

10:00 A. M.—All Day Excursion on Steamer Susquehanna
Assemble in Lobby, The Roosevelt for Steamer Trip on Lake Ponchartrain, Industrial Canal, Mississippi River. Hallowe'en Party, Dancing and Buffet Luncheon on Board. Electric Train to Steamer Susquehanna leaves Corner Canal and Rampart Streets, one block from The Roosevelt, at 10:30 A. M. Steamer leaves West End on arrival of this train. Returning to West End at 5:00 P.M. for a visit to Southern Yacht Club. Train leaves West End at 6:00 P. M.

Saturday, November 1:

10:00 A. M.—Tour of Old French Quarters
Under direction Professional Guides.

1:00 P. M.—Take Auto at The Roosevelt for Country Club (Ladies)

1:30 P. M.—Luncheon for Ladies, New Orleans Country Club.

5:30 P. M. Sharp—Banquet and Dance (Informal)
Banquet Hall 12th floor The Roosevelt.

Those present were:

Austin, Texas—B. L. Pillow and wife, Orville D. Parker and wife.
Atlanta, Ga.—L. B. Thompson and wife.
Ashland, Ky.—W. A. Ginn.
Baltimore, Md.—V. F. Albert, F. G. Adams and granddaughter, A. Stevens.
Boston, Mass.—Thomas D. Lockwood and wife.
Buffalo, N. Y.—Harvey D. Reynolds.
Butte, Mont.—Levi S. Wild.
Bradley Beach, N. J.—F. J. Weis, wife and daughter.
Clarks, La.—W. K. Bush and wife.
Chicago, Ill.—Mrs. N. S. Burgess, Miss Elizabeth B. Michael, Oscar Swanson, M. F. Strider, A. W. Towsley and wife, R. W. Towsley, Miss Margaret Ulbrich.
Cincinnati, Ohio—T. T. Connely and wife.
Council Bluffs, Iowa—E. L. Davis and granddaughter.
Columbus, Ohio—O. H. Newell and wife.
Colton, Calif.—M. E. Spragins and wife.
Dallas, Texas—G. P. Brinkley and wife, B. P. Hancock and wife, J. G. Hilbert and wife, A. L. James and wife, F. A. Mohr and wife, J. P. Rohling and wife, Mrs. A. H. Schroeder, J. F. Wilson.
Detroit, Mich.—O. F. Clark and wife, R. H. Dunphy.
Emporium, Pa.—John D. Logan and wife.
Greensburg, Pa.—D. J. Seiders and wife.
Houston, Texas—John D. McLelland and wife.
Jersey City, N. J.—W. F. Taylor.
London, Ont.—Charles Forrester and wife.
Lincoln, Nebr.—J. H. Gable and wife.
Memphis, Tenn.—J. E. Drewry, Horace Johnson and wife.
Manor, Pa.—Clark M. Greek and wife.
Morrisville, Pa.—E. Y. Morris and wife, H. A. Sultzbach and wife.
McKees Rocks, Pa.—J. K. Ray.
Montgomery, Ala.—Edgar Winter, Miss Abercrombie.
McDonoughville, La.—H. E. Willis.
New Orleans, La.—F. J. Akesson, B. G. Brown, F. A. Burgess, R. F. Blanchard, W. R. Boydell, G. H. Bagley, Charles A. Cuneo, Clifford Cord, J. S. Coyle and wife, A. A. Cohn, James G. Davis, Tim H. Dennis, L. H. Dinkeldein and wife, C. J. Davis, Robert Ewing and wife, H. F. Farmer, J. W. Feely, Mrs. M. L. Feehan, John J. Gallagher, Simon S. Gallagher, C. W. Howard, L. Hickerson, John H. Huber, J. H. Holthaus and daughters, W. H. Hickerson, E. H. Hogshead and granddaughter, Edward Hundley Jordan and wife, Jesse A. Jefferson and wife, H. H. Julian, S. W. Jackson and wife, E. E. Jackson, Mrs. F. M. Kirkwood and granddaughter, George F. Kloor, E. J. Knecht and wife, C. E. Liddy, M. M. Lott and wife, S. B. Metts and wife, G. R. McDonald, wife, son and daughter, J. A. Meynier, John F. Mathews, Mrs. Rosa Mayers, James Marque and wife, Jayo McConniff, W. T. Naff and wife, Robert C. Norton and wife, Edward J. Norton and wife, P. R. Napier, J. T. Pollard, Mrs. L. K. Peleaz, A. N. Porteous, Geo. Perret, M. I. Pardee and wife, Wm. A. Porteous and wife, H. J. Parr, Henry W. Robinson and wife, T. J. Rodgers, James H. Rooney, J. T. Remley, Louis H. Stanton, Tom Steen and wife, W. G. Scheible, Robert C. Servat and wife, George C. Shepherd and wife, T. W. Standige and wife, W. A. Simms, L. W. Sauvinet, Geo. B. Stewart and wife, C. A. Stair, L. J. Tognoni, Val Thrain, C. W. Towsley and wife, A. R. Triche, G. J. Verges, Peter Vidal, Sr., J. M. Wagstaff and wife, L. H. Witherspoon, J. R. Wright and wife, F. M. White, J. T. Youngblood.
Newark, Ohio—Charles A. Anderson, Elmer F. Murchand.
New York—David Homer Bates and wife, Thos. E. Fleming, J. M. Hurty, George W. Hickey, Charles Shirley and wife, C. R. Tilghman and wife, John B. Taltavall and wife.
North Plainfield, N. J.—John T. Needham.
Nashville, Tenn.—J. R. Terhune and wife.
Pittsburgh, Pa.—Wm. Allenbaugh, C. L. Allison and son, Miss Susan R. Haney, John F. Stewart, W. R. Smith and wife.
Philadelphia, Pa.—John A. Chapman.
Richmond, Va.—J. E. Leake and wife.
Scranton, N. D.—R. W. Cornell and wife.
San Francisco, Calif.—C. J. Eldridge and wife.
St. Louis, Mo.—John A. McIntyre, Tony Nederweiser.
Shreveport, La.—J. C. Robb.
Trenton, N. J.—C. Harris King and wife, Wm. R. Morris and wife.
Topeka, Kan.—C. A. Musgrave, wife and daughter.
Union City, Pa.—F. D. Burt.
Uniontown, Pa.—C. L. Crosby and wife.
Wilkinsburg, Pa.—Miss Ida Greek, S. W. Geary.

Novel Telephone Uses

TELEPHONE-EQUIPPED barber chairs are the latest innovation in Atlanta, Georgia. The Biltmore barber shop in that city has equipped each of its chairs with individual telephones for the use of patrons while the barber clips and scrapes away. There are twelve chairs in the shop with telephone connections from each to a miniature switchboard operated by the cashier.

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PERSONAL

Weagant Joins De Forest Co.

ROY A. WEAGANT, until recently chief consulting engineer for the Radio Corporation of America and one of the world's foremost radio and wireless experts, has been elected vice-president and chief engineer in charge of technical activities for the De Forest Radio Company, Jersey City, N. J.

POSTAL TELEGRAPH-CABLE COMPANY

JOSEPH J. CARDONA has been appointed treasurer of the company. At a meeting of the Board of Trustees of the Mackay Companies, held on October 27th, Milton W. Blackmar was appointed treasurer of the Mackay Companies, Peter E. Solaski was appointed assistant treasurer and E. D. Thornburgh was appointed assistant secretary. On the same day Mr. Blackmar was made treasurer of the Commercial Cable Company.

C. J. SMITH has been elected Treasurer and a Director of the Commercial Pacific Cable Company, succeeding the late Mr. E. C. Platt. Robert Chamberlain has been appointed Accountant of the Commercial Pacific Cable Company, to succeed Mr. Smith.

THE Commercial Cable Company is out with a new Cable Rate book, replete with general cabling information, a list of differences in time in the cities of the world, time of transmission of letters; business holidays, etc.

OBITUARY

FRANK A. PHILLIPS, aged sixty-five years, an old time telegrapher, died at Kingston, Ontario, on October 10th. Mr. Phillips was employed in the seventieth's with the Dominion Telegraph Company at Montreal and Toronto, and later by the Western Union Telegraph Company at Chicago and New York. On July 19, 1883, he blew the whistle in the operating room, 195 Broadway, which was the signal for the great telegraphers' strike. Of late years Mr. Phillips has been in business for himself at Kingston.

HENRY J. Stevens, aged seventy-four years, died suddenly of heart failure, on October 13th, at Salem, Va. while walking in his room. Mr. Stevens had recovered from an attack of acute indigestion and was again about his business. He was a native of Roanoke county, near Salem, Va. He had lived for four years in Washington and for fifteen years in Mobile, where he was superintendent for the Western Union Telegraph Company over a wide territory in the South.

Mr. Stevens was a member of the building committee of College Lutheran Church, completed a year ago, and was active in church work. He was an Odd Fellow and a Mason. He is survived by his widow; two daughters, Mrs. F. H. Marshall of Seaford, Del., and Mrs. Frank Walters of Salem.

P. H. HUGHES, aged seventy-four years, President of the Palestine Telephone Company, and one of the leading citizens of Palestine, Texas, died on October 27th.

THE man who first ventured into Galveston when, in 1900, that city was ravaged by a great tidal wave, and flashed the first news of the horrible catastrophe is dead.

With the announcement on October 21st, of the death in San Antonio of Adolph Grauer, details of the romantic life history of one of the oldest pioneers in the development of the telephone system, were recalled by many of his intimate friends.

Adolph Grauer was born fifty-two years ago in a small town in Alsace-Lorraine. While yet a mere youth and speaking only German and French, he came to America to seek his fortune. He was, like most ambitious youths with similar aspirations, penniless when he arrived here. For a while he labored as a zinc miner in Joplin, Mo. Then came the first awkward telephone—and it attracted him. He continued in the service of the Southwestern Bell Telephone system until his death—a period covering more than thirty years.

Beginning as a lineman, Mr. Grauer developed such an aptitude for telephone work that he soon was promoted to an executive position. It was he that directed the laying of the first submarine cable between Galveston and the mainland, nearly twenty years ago. At the time of his death he was division plant superintendent.

"Dutch,' as he affectionately was known to all of his friends, was the living example of the golden rule", declared William H. Walker, employment manager of the company. "He was beloved by the lowliest day laborer to the highest official. He was one of the few remaining associates of Charles J. Glidden, founder of the Bell system. His lengthy service entitled him to hold a prominent place in Lone Star chapter, Telephone Pioneers of America.

"Mr. Grauer, at the risk of his own life, went in the first goverment boat which visited Galveston when the tidal wave had subsided. The sights which greeted his eyes were awful. He took off his coat, put on a pair of lineman's spurs and soon had re-established wire communication with the mainland."

Mr. Walker's tribute was reiterated many times by members of the Bell company.

Mr. Grauer is survived by his wife, a daughter and two sons, who live at 1109 Dennis avenue.

Halifax Cable

REPORT of Halifax and Bermudas Cable Company for year ended June 30th, shows net result of year's working is credit balance of £21,653, compared with £22,593 for previous year. Balance available is £52,950, less £3,202 repairs, £2,500 interim dividend of 5 per cent. free of tax, and £1,122 depreciation of spare cable, etc., leaving £46,126. Directors proposed further dividend of 5 per cent., free of tax, leaving to be carried forward £43,626, subject to corporation tax.

ACCORDING to the Bureau of Census of the Department of Commerce, no railroad reported the use of radio for train dispatching in 1922.

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THE WESTERN UNION TELEGRAPH CO.

NEWCOMB CARLTON, president of the company, who was injured on October 4th, by being run down by a taxi, is again at his desk.

J. C. Willever, vice-president, sailed for Europe on the Steamship Majestic on November 8th.

J. G. Mc Nerny of the Western Union Telegraph Company, Buffalo, N. Y., accompanied by his wife, was a city visitor on November 3rd.

JOHN STANGLE who was recently reported as having suffered from a broken collar bone in an automobile wreck, is again at work in the company's office at Cincinnati, Ohio.

Portland, Oregon, Broadcasting Station

THE employees of the Wetsern Union Telegraph Company at Portland, Oregon, recently furnished the talent for an entire musical program broadcasted from KGW, the Portland Oregonian's splendid broadcasting station. Complimentary comments on the program were received from as far away as Arizona and Missouri.

All of the performers, including the accompanist, are employees except Mrs. A. F. Schmidt who is the wife of the Division Vice-president of the Association of Western Union Employees. Mrs. Schmidt is a talented musician and instructor and aided materially in the successful carrying out of the program.

The following is a list of the numbers presented:

1. "You," popular music. Western Union Messengers' Orchestra. L. Levitt, violin; J. Grant, banjo; L. C. Berger, drums; J. Brennan, piano.
2. "Faded Roses, Faded Flowers," Miss Florence Hawley, soprano; L. Levitt, violin obligato; W. D. Bloomer, piano.
3. "E'en as the Flower," Miss Eva Brask, alto; Miss Esther Levin, piano.
4. "For You Alone," Alexander Putnick, tenor; Mrs. A. F. Schmidt, piano.
5. "Elegy," L. Levitt, violin solo; W. D. Bloomer, piano.
6. "Smilin' Through," Male quartette: Messrs. Kinne, Davis, Keller and Robb. Mrs. A. F. Schmidt, piano.
7. "Papilions," Miss Esther Levin, piano.
8. "God Touched the Rose," Miss Eva Brask, soprano; Miss Esther Levin, piano.
9. "Under the Window," Alexander Putnick, tenor; Mrs. A. F. Schmidt, piano.
10. "A May Morning," L. Davis, tenor; Mrs. A. F. Schmidt, piano.
11. "Mighty Like a Rose," Miss Florence Hawley, soprano; W. D. Bloomer, piano.
12. "Rockaby My Baby Blues," Messenger's Orchestra.

DELIVERY MANAGER LOOP, in charge of the Portland Messenger Department has developed an unusual force of messengers. Among the activities which have helped to bring up the personnel of the force is an athletic association. This association maintained a baseball team in the city league the past summer and won twenty out of twenty-nine games played.

One of the messengers, Loris Goff, is a cartoonist of no mean ability. A sketch of some of his impressions of the ball team are reproduced herewith.

PACIFIC COAST CHAMPIONS
"ARMIE" SWATT KING OF THE SEASON STAGING ONE OF HIS DESPERATE-HOMERS
BROWNIE RIGHT UP IN THE AIR ON A SECOND BASE PEG
BRENNAN GETTING SET FOR A LITTLE JAZZ TIME IN THE DIAMOND
FRANKS- "NOTHIN TO IT"
COME-ON YOU PORTLAND
MANAGER LOOP AT CENTRALIA
TAKE A PEEK AT HARVEY- BETTER IF YOU COULD SEE HIM IN ACTION
HAROLD SAX-ON FIRST- AND THEY'LL ALL STOP THERE
-GILKIE- SOME-ORE-THAT BIG LEAGUE STUFF

Among the other activities of the organization is a seven piece orchestra that is developing well. They have played for the local broadcasting stations and are generous with their music at hospitals and like places where they play without charge.

Rhode Islanders Get 100,000th Telephone

THE New England Telephone and Telegraph Company recently installed its 100,000th telephone in Rhode Island. The instrument was placed in the home of Nathan D. Zuill, of Pawtucket. Rhode Island, although the smallest state in the Union in area, now has as many telephones as the states of Alabama or Louisiana and exceeds fourteen other states in the number of instruments.

The 1924 Year Book of the Merchants' Association of New York

THE record of the Merchants' Association for the year ending on May 1, 1924, as set forth in the Year Book, now ready for distribution to the members of The Association, shows activities of great value to the City and to the business interests of the country in general.

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New York Telegraphers' Aid Society

THE Forty-fourth Annual Entertainment and Reception of the New York Telegraphers' Aid Society in behalf of the Relief Fund, will take place at Terrace Garden, 58th Street, between Lexington and 3rd Avenues, Manhattan, on Friday evening, November 21st.

THE radio broadcasting of the election returns on the night of November 4th was very interesting to old telegraphers who have always heretofore performed the part of distributing the returns to the general public in the shape of bulletins, transmitted by Morse signals over specially arranged circuits.

Sitting in one's easy chair at home listening to the voice of an expert political reporter and hearing his comments and explanations of the figures as they come in, made the news very intelligible and convincing, much more so than reading the same words written upon flimsies and bulletin boards.

It was very pleasant to sit comfortably and hear the returns rather than to stand shivering in the cold wind outside of some newspaper office straining eyes to read the hieroglyphics chalked on a blackboard by an operator copying the clicks of a sounder beside him at an enforced speed that is too much for his cramped fingers unaccustomed to write with crumbling chalk in the presence of a noisy and critical audience.

It was the first time that radio has had the opportunity to carry the tidings of a presidential election, and it made a mighty good job of it— so good that it seems likely that the more direct and satisfactory method of disseminating such news will supersede the old fashioned bulletin source of the telegraph and telephone companies.

The broadcasting on election night certainly was the beginning of a new era in the distribution of news to the public.

Our friends of the Radio Corporation of America are to be congratulated upon their achievements.

Radio Antennas Not Lightning Menace

RADIO antennas are not to be regarded as effective protection against lightning, according to the Bureau of Standards, but, on the other hand, their limited extent prevents them from becoming a menace. They need not be considered as potential inviters of lightning strokes, being in a class with other metal objects normally found about buildings, such as metal gutters, down-spouts, and wire clothes-lines.

As commonly installed, they are of relatively small size, both in extent and in the diameter of the wires used. If grounded, or provided with a lightning arrester, they may effect gradual drainage of electricity as well as a lightning rod, but a direct stroke is likely to fuse them or tear them from their fastenings on account of their small diameter. Moreover, the ground lead of an antenna constitutes a lightning rod having a single down conductor, whereas good lightning rod practice requires at least two down conductors electrically parallel, but as widely separated as possible.

Radio Sets for the Blind

THE New York-Herald-Tribune of November 6th announces that it has inaugurated a campaign to provide radio sets in the homes of the needy blind throughout the country. This is the joint undertaking of the Herald-Tribune, the American Foundation for the Blind and the American Radio Association and other newspapers of the United States will cooperate in the movement which is endorsed by President Coolidge, who has expressed his willingness to be affiliated with the effort, and will head an honorary national committee.

The Herald-Tribune will receive subscriptions to the necessary fund and acknowledge receipt in its columns.

All money raised by public subscription is to be spent for the type of sets to be chosen by a technical radio committee on which the Bureau of Standards will be represented.

All expenses of the campaign will be borne privately by individuals who are in sympathy with the movement.

A well known firm of public accountants; Messrs Price Waterhouse and Company will donate their services in auditing the accounts and publish a detailed report.

This movement is a commendable undertaking which we trust will be supported by the readers of the AGE.

2,700,000 Words Sent Over Washington Wires During World's Series; Said to be a Record

MORE than 2,700,000 words were filed with the Western Union Telegraph Company by sport writers in the four games of the world series in Washington recently, according to figures made public by company officials.

This is said to be the largest wire file for any single event in the United States in the history of the telegraph company. It surpasses by many thousands of words the volume of business handled at Presidential inaugurations and other big affairs that have been held in Washington.

The file from Washington was much in excess of the volume of business handled during the three games played in New York. The Postal Telegraph Cable Company also handled 500,000 words.

The Western Union file for each of the four games played in Washington was as follows: Oct. 4, 598,614 words; Oct. 5, 488,602 words; Oct. 9, 504,884 words; Oct. 10, 611,000 words.

In handling this torrent of words the Western Union installed 114 wires in the Washington ball park. The services of ninety operators were utilized.

The burden of wire work for the games played in Washington fell on the Western Union, which has an exclusive contract for supplying such facilities in the local American League Park.

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"Father of Wireless"

M. EDOUARD BRANLY, the famous French scientist and "father of wireless telegraphy" (he invented the Branly "coherer," one of the earliest forms of detection, anticipating the crystal detector era), was the recipient, of thousands of congratulations on the occasion of his eightieth birthday recently.

M. Branly is one of the hardest-working men in France, devoting ten hours every day to experimental researches.

Professor Branly came into prominence again in 1921, when Parliament voted a subvention of 20,000 francs to permit him to continue his researches in the laboratory of the Catholic Institute. The value of his discovery was beyond discussion, and his scientific genius did not pale before that of Signor Marconi.

Despite his incomparable industry, M. Branly has worked in comparative poverty. A banquet in his honor took place on November 6th.

A Book About Success

F. E. d'HUMY has written a book about SUCCESS which should be read by every telegraph, telephone and railroad official and employee.

The author has long been a student of the circumstances and forces which are related to personal progress and in this new book he has presented a concept of the subject which enables any one who can read to gain new footholds along the path of life.

This work on SUCCESS is practical. It points out the essentials of objective and character which may be cultivated to advantage by the individual.

Copies of the book may be obtained from Telegraph and Telephone Age, 253 Broadway, New York, at the price of one dollar per copy.

Try the Operator's Way of Saying Them

TELEPHONE operators are taught voice technique, but many telephone subscribers keep on calling numbers without giving much thought to the manner in which their words are pronounced. Perhaps some mistakes might be avoided by taking a leaf from the operators' own book of instructions.

The next time central repeats the number you call, you will notice that she makes a slight pause between the hundreds and tens, as, for example, Bryant 4296, which she renders Bryant 42 (pause) 96. Then again in repeating digits, central uses an interesting system of pronunciation which might be copied with satisfactory results. Here is the way she usually does it:

O—to be spoken as "OH"—with a long O.
1—as "WUN"—with strong N.
2—as "TOO"—with a strong T and a long OO.
3—as "T-H-R-E-E"—with slightly rolling R and long E.
4—as "FOER"—with long O.
5—as "FIVE"—with long I and strong V.
6—as "SIX"—with a strong X.
7—as "SEV-EN"—with two syllables.
8—as "ATE"—with long A and strong T.
9—as "NIEN"—one syllable, with strong N on the end.

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Because there was a more keen and accurate co-ordination between all the nerves and muscles of his body. Brain and brawn were in perfect gear.

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The Candler System brings about COMPLETE CO-ORDINATION of all the faculties used in telegraphing, and puts the brain, nerves and muscles in perfect gear so that Sending and Receiving is made EASY AND NATURAL. More than 30,000 telegraphers have been helped by this system. A great benefit to every one says Noted Telegraph Editor. Positively guaranteed to improve your sending and receiving 50 to 100%, regardless of age. Write for FREE booklet "Scientific Telegraphing," containing the secret of fast telegraphing. A postcard will bring it FREE and without obligaton. Write NOW!

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FORTY-FIFTH YEAR
HAVE YOU $500.00?
It takes a long time to save that amount and an emergency may come before you can do it.
A GOLD AND STOCK LIFE INSURANCE ASSOCIATION POLICY is worth $500.00 as soon as it is issued for Telegraphers and Others in Electrical and Telephone Service
INITIATION FEE, $1.00
Dues, according to age at entry.
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Between 30 and 35—60 cents per mo. Between 40 and 45—$1.00 per mo.
INSURANCE, $500.00 in payments of $50.00 per Month to Beneficiaries for Ten Consecutive Months.
F. E. FITZGIBBONS, Secretary,
195 Broadway, New York

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KDKA, World's Pioneer Broadcaster, Four Years Old on November 2nd

FOUR years ago, November 2nd, radio broadcasting, in its modern form, had its start, when KDKA ie world's pioneer station of the Westinghouse Electric and Manufacturing Company, first went on the ir, broadcasting the election returns that resulted n the election of the late Warren G. Harding to the Presidency of the United States.

November 2, 1920 is an anniversary date in the nnals of broadcasting for on that date was started movement which has today resulted in the establishment of more than 500 broadcasting stations in the United States, a radio audience estimated at from 12,000,000 to 50,000,000 people, and a business of more than $300,000,000 per year. It has resulted in the establishment and operation of broadcasting stations in Canada, Mexico, South America, Great Britain, Germany, France, Czecho-Slovakia, Australia, and China. A world-wide movement was set in motion which is still striding forward and which apparently knows no limitations.

The Westinghouse Company for years prior to November 21, 1920, had been operating from the home of Frank Conrad, in Wilkinsburg, Pa., an experimental station, from which were broadcast nightly phonographic selections and addresses. This attempt having been favorably received by a limited audience, H. P. Davis, vice-president of the Company caught the radio vision and foresaw radio broadcasting as a public service. He ordered the station removed from Mr. Conrad's home, and arranged for a regular public service from a station to be located in East Pittsburgh. Mr. Conrad's original station was known to radio amateurs throughout the length and breadth of the United States as 8XS. The new station was assigned the call letters KDKA by the Department of Commerce. These letters were culled from the call letters assigned to ships as there were no arrangements in those early days for the assigning of radio broadcasting calls.

With these new letters and also with the announcement that a regular service was being instituted, KDKA went bravely on the air. The first radio party, so far as is known assembled at the Edgewood Club in Edgewood, Pa. Here L. W. Chubb, manager of the Westinghouse radio engineering department installed a radio receiver. The small party of assembled guests, for the first time in their lives, heard a radio program.

As may be surmised, the first program was a success. Apparatus was improved and refinements made giving KDKA a greater and greater range and continually added to its quality. These refinements are still going forward, and engineers in charge of the station have often stated that KDKA has never been more than three months old. In other words the station has been added to so continually that it never has had an opportunity to acquire a settled state.

The programs in those early days consisted of phonograph records and addresses, given in a random manner. Westinghouse officials at KDKA soon forsaw the need of a regular entertaining program consisting of a wide variety of features which were necessary to hold the attention of an audience consisting of people having a wide variety of tastes.

So the search for program material started, which too, has never ended. Out of that original search for program material, KDKA established another unique record in that it first put on the air every known kind of radio feature which today make up radio programs. It was KDKA which first broadcasted news, time signals, sporting events, church services, and the many variations of the church theme, bed-time stories, vocal and instrumental selections, farm programs, etc. The only event which KDKA did not broadcast first was radio grand opera. That honor goes to KYW, a sister station operated by the Westinghouse Company in Chicago.

KDKA was also the pioneer in outside pick-ups. This station was the first to install telephone lines to remote points, pick-up the voice or instrumental selections there, and run them to the station on telephone lines. As an instance of how thoroughly outside pick-ups make possible the programs broadcasted from KDKA, it is only necessary to state that some 42 of the leading institutions in Pittsburgh have KDKA pick-up installations.

All this pioneering work called for steady development in all branches of electrical engineering. Not only was the station constantly developed but extraneous assistants were also invented. Thus resulted the present form of amplifier boxes used at KDKA, remote control of studio and station, the glow-discharge microphone, and other paraphernalia all related to broadcasting.

It was about three months or more after KDKA went into operation that public interest was aroused sufficiently to the point where it made itself felt. During this period the Pittsburgh Post and the Pittsburgh Sun recognized the value of radio broadcasting to the public and started printing the programs of KDKA and otherwise giving the station valuable publicity.

Later a radio broadcasting studio was established in the Pittsburgh Post, this newspaper being the first in the world to be linked with a radio station. This period of inactivity was just the lull before the storm, for when public enthusiasm was aroused at this wonderful new form of entertainment it knew no bounds. Those who remember the struggle to get radio apparatus in the winter of 1921-22 well know how everyone seemed to be on the lookout for radio apparatus which was nowhere to be found. The manufacturers had been swamped with orders and not having had an opportunity to gauge their market had not produced in quantities to meet the public demand.

After the success of KDKA had shown the popularity of radio broadcasting other stations sprang overnight until the country was filled with them. Throughout the length and breadth of the land, radio stations filled the air with radio entertainment, and an eagerly sought for and heavily patron-

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ized service had been instituted.

In the meantime the Westinghouse Company had not been idle and had installed stations at Newark, N. J., Springfield, Mass., and Chicago. WJZ, original Newark station, is now operated by the Radio Corporation in New York, but the other two, WBZ and KYW, are still operated by the Westinghouse Company.

The years of 1921 and 1922 saw the establishing of these radio stations but equally important developments in reception were being produced. Among the most important of the receiving developments was the WD-11 tube, brought out by the Westinghouse Company in answer to a demand on the part of the public for a tube set which could be operated at low cost. Instead of the storage battery the large tubes required, this new tube operated on a 40-cent dry cell. This deserves an honorable mention among those things which helped to make radio possible because it gave the people tube sets which could be operated at low cost and which were greatly superior to the crystal detector receiver.

Early in 1922, the Westinghouse Electric and Manufacturing Company started experimenting with short waves, foreseeing the need of some connecting link between radio stations so that one station could pick up and repeat the programs of another station. These experiments were carried on for a year and resulted in the building of the first short-wave station as an adjunct to the long-wave station at KDKA, another pioneering achievement.

Station KFKX was erected at Hastings, Neb., in October, 1923, as a repeater station for KDKA. It was the first station of its kind in the world, and still holds that unique position. This station regularly repeats the KDKA program from Pittsburgh picking up the short-wave broadcast from KDKA and repeating on the long-wave assigned KFKX, thus doubling KDKA's effective range.

Once KFKX was established, it was but a short step to the erection of a short-wave receiver in the plant of the Metropolitan Vickers Company at Manchester, England. This station was linked with land lines with the stations operated by the British Broadcasting Company, and on January 1, 1924, Vice-President H. P. Davis of the Westinghouse Company sent a greeting to the peoples of Great Britain, which was picked up and repeated from every station in Great Britain, the first event of its kind in the world's history. Since that time many of KDKA's programs have been repeated in Great Britain and another use for radio broadcasting developed.

Since that date KDKA has made notable use of short waves, two record-making achievements were the broadcasting of the Firpo-Wills boxing bout direct from the ringside to Buenos Aires, where a loudspeaker installed in the headquarters of La Nacion gave the blow-by-blow account to the waiting fans, and the more recent International radio dinner given by the H. J. Heinz Company.

The developments made in radio broadcasting at KDKA have been the history of radio broadcasting in the United States, and, of course, of the world. KDKA, therefore, richly deserves its title of "World's Pioneer Broadcasting" station, as it stands unique and unchallenged among all the broadcasters of the world; the station having the proudest record of any.

KDKA has been in continuous operation now four years and its admirers hope that it will remain in operation so long as radio broadcasting may last and continue to add to its prestige with newer and greater triumph as the years roll on.

Radio Corporation of America

GENERAL J. G. HARBORD was elected a vice-president of the Old Time Telegraphers' and Historical Association at their 42nd reunion at New Orleans, La., on October 30th, 31st and November 1st.

E. J. NALLY, Managing Director of Foreign Relations, will return to his office at Paris on November 29th.

Telegraph and Telephone Life Insurance Association

THE following letter has been sent to all members of the Telegraph and Telephone Life Insurance Association:—

"N. M. Giffen, who has served as Secretary of your Association since 1918, resigned to re-enter the service of the Western Union Telegraph Company on November 1. In accepting the resignation, the following resolutions were adopted by the Executive Committee:

"RESOLVED: In accepting the resignation of Mr. Giffen, we desire to testify to the faithful and loyal service rendered by him during the past five years, and

"RESOLVED: that he carries with him into his new position the best wishes of the Committee.

"Thomas E. Fleming was appointed Vice-President and Secretary for the unexpired term. Mr. Fleming has been active in the work of the Association since 1888, serving as its Secretary from 1888 to 1897; on its Auditing Board from 1898 to 1913, when he was elected a member of the Executive Committee. In 1917 he was elected Vice-President, which office he continues to hold.

"I bespeak for the new Secretary the loyal and earnest support of the membership.

"T. W. CARROLL, President."

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CONTENTS

PAGE

Fifty Miles from Nowhere. By W. Lee Dickson (Continued from page 519, November 16th Issue) 534

Why Super Broadcasting Means Better Service. Address by David Sarnoff 537

Address of H. B. Thayer 538

Facts About the Telephone. Cablegram Mutilations in India 539

Plymouth, Ill., Man Unearths Ancient Pewter Full of Coins Dating to 1856 540

Change the Name of Radio Central. Institute of Radio Engineers Nominations for Officers, 1925. Charles O. Pierson Honored by Commission. 541

Mind Training for Health and Success. By W. H. Candler. (Continued from page 512, November 16th Issue) 542

A Romantic Marriage Between the Children of Well Known Electrical Men 545

Editorial Comment—Radio Election Returns Received on Speeding Trains.. 546

General J. G. Harbord Pictures Future of Radio 549

Obituary 550

Personal. Postal Telegraph-Cable Company 552

The First Permanent Broadcasting Station. Western Union Telegraph Company. Western Union Head Says Radio Cannot Ever Replace Wires. By Drew Pearson 553

Messenger Boys Have Many Duties 555

School for Lineman's Training. Robert Vincent Woods 556

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Fifty Miles From Nowhere

By W. Lee Dickson.

(Continued from page 519, November 16th issue)

Jerry stepped very close to Hornby, looking down into the excited, unbeautiful face. "I shall see Miss Jessup whenever I damn please, if she likes," he said calmly. "I knew her long ago, for that matter."

"You're a liar!"

Jerry's arm had been waiting for this; it acted as though the words had released a spring. Hornby, hit stingingly under one eye, fell back against the wall of the quarters. There was a convulsive gulp, and Jerry laughed aloud. "Good Lord, Hornby! You've swallowed your gum!"

The blow and the internal catastrophe stopped Hornby. One hand to his face, the other over his stomach, he said: "It's mutiny and assault—that's what it is! You'll find out tomorrow!" Then ingloriously he went.

The following morning, a welcome sun that rose through a cloudless sky made the events of the previous day seem unreal, imagined. The calm of the station, just waking, belied such thrilling things. But Jerry waited.

At mess he was chided for not having played for the men, and forced to promise more entertainment that evening. Obviously, they were ignorant of the private dramatics in which he had taken part. He jested with them, listened indifferently to fresh reports of a Republican siege of the station—and waited.

His suspense was not long. Reporting at the London key, at eight, he was met by Hornby, bellicose and chewing as ever. Only, beneath one small eye Jerry noticed a blush token of the evening's brief encounter. Oddly enough, he felt rather sorry about it. But Hornby shattered any commiserating emotions without delay.

"Martin, you're to report to Mr. Jessup at once. You're relieved here!"

"Right-o!" said Jerry, briefly enough. He left the office and made for Mr. Jessup's house. "Well, it's what I expected," he mused; "Hornby would run to Jessup about it."

The front door stood open, and Jerry entered the hallway. On one side of this, behind a closed door, was the room that served as the superintendent's office. He was immediately conscious of voices in this room. Another moment and he recognized those of Mr. Jessup and Jo. Natural enough; he'd wait. Absently he stared at one of those indelicate pictures of an unmistabably dead fish, on Mr. Jessup's wall. Then a name—his own—and other words that came through the door, arrested him. The man had said: "Martin's a belligerent pup! He's got to learn a lesson!" Then Jo's voice, on a plaintive note, said something about "too strict father. . . ." She was pleading for him! Jo! The man grumbled something else about insubordination and discipline. Then, clearly: "Father, I don't care—I like him! I like him awfully! I'm glad he hit Hornby. I've tried to t you a thousand times I don't like Hornby, and never can. I don't care if he *will* be a superi tendent!"

Jo! But suddenly Jerry realized he was eave dropping—and liking it, too. Should the door ope he would unquestionably be discovered. Th would be ruinous. Quickly, stealthily, he tipto from the hall, down the steps, and gained t quarters invisible from Jessup's window. In t doorway he paused, breathless, his heart hammerin Jo had said, "I like him awfully!" She had inte ceded for him! He would never let her know; b he would never forget.

He promptly faced the superintendent's hou again, and blared forth "Tipperary" in his loude whistle. Then he clumped up the steps like a gia and pounded over the threshold. As expected, t voices had stopped. The door opened, and Jo can into the hall. Jerry thought that her eyes wer moist. He felt awfully like grasping her hand and saying terrific things. Perhaps this was t strange light she saw in his own eyes when she sai casually: "Good morning Jerry. Father's waitin for you." He mumbled "Thanks," and before h could add to it, she turned and went upstairs.

The omnipotent Jessup, stern, gray and senten tious, greeted Jerry with "Sit down, sir!" Jer obeyed. Mr. Jessup then briefly summed up hi offenses. He had made the men late at relief, an this before presenting his papers; he had then over slept and failed to report as ordered; he had clan destinely and against regulations sought out an *annoyed* Miss Jessup; he had been impertinent t Mr. Hornby, and, finally, had assaulted that person age. All within twenty-four hours. This was littl news to Jerry. He remonstrated that he had no expected to see Miss Jessup; did not even know sh was here, but the answer was "Pooh-pooh, Martin!" So he abandoned thoughts of defense and waite sentence.

"I don't like to fine you, Martin, or send in a bad report to the company—yet. I've decided to give you four hours extra duty, at nights, for one week." He paused; then, as Jerry said nothing: "It's—it's a bit hard to tell you exactly how I feel about your seeing Miss Jessup. She tells me you met when you were wounded. That was very fine of you, but the war's over now, and, frankly, I must forbid your seeing her again. You will understand. An operator with twelve pounds a month you know—it's quite impossible. That's all; but don't forget!"

Now it was far worse than if Jo had not come back for him at all. The station assumed an unbearable aspect.

When he reported for his first extra duty the bellicose Hornby was there, looking more like the proverbial cat who had swallowed the canary than the supervisor who had gulped his gum. He was quite as puffed; and one might imagine his purring.

After two days of melancholy chafing under the

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superintendent's orders, and before reporting again night, Jerry sought Disbrow, in the latter's house. Disbrow would be understanding, sympathetic, safe to confide in. Jerry, never having known a father, turned to this man much in the spirit of a son who seeks consolation and advice from an experienced, yet softened, source. His countryman welcomed him happily. Mrs. Disbrow, who had been sewing, rose fumbling, and went up stairs.

"Well, Martin!" Disbrow exclaimed, placing one arm about Jerry's shoulders. "I was afraid I'd driven you away from me. Perhaps I was a bit too meddling, eh?" He lowered his voice, and nodded toward the steps. "You must excuse Mrs. Disbrow. She—she doesn't like talking to people; it frightens her." Then, heartily: "But, my word, I'm glad to see you, son! Sit down there. Anything on your mind?"

There was much; and Jerry thus encouraged, hastened to unburden it. He told Disbrow everything—from his first meeting with Jo to his present predicament. The older man listened gravely and when Jerry had finished, asked quietly, "Is that all?"

"Yes, sir."

"And you want my advice?"

"Yes, sir."

"Then I'm sorry, son, but I'll have to repeat my words of the other day; just get out. Get away from the cables and into the world."

Jerry countered. "But Jo—Miss Jessup— don't you see?"

Disbrow's smile was burdened with kindness. "Of course I see, though young fellows like you never think we older men were once your age. It seems too much to imagine. But, believe me, every older man remembers only too well the emotions of his youth and its impulsiveness—only too well. . . This girl, what little I've seen of her, is doubtless a sweet, fine little lady. To you there's no one like her from Pole to Pole. Believe me or not, Martin, there *are* others. . . . And Mr. Jessup is quite right. Consider now: you have twelve pounds a month. Granting she's in love with you—"

Jerry interposed. "I don't know that she is, sir."

"But granting she is, consider now: do you want to condemn a lovely creature like her to *your* earnings? My boy, youre on a brink. Its hard, I know, but, oh, take my advice! Get a real start in the world; then time enough to marry. He spread his hands in gesture of finality. "Thats all I can tell you, Martin."

Jerry hoped that, somewhere, there might be a middle course. But Disbrow, though gentle, was unyielding. At parting, he said, gripping Jerrys hand: "Don't let it beat you, boy! Oh, if I were your age—if I were your age! Good night, and good luck!

Good luck! Jerry wondered if there was such a thing. He had gone for advice and knew that that advice was sound. But then he decided that Disbrow was grown pessimistic. He determined not to "get out"—without Jo. . . . And Disbrow, being fifty, knew well that his counsel would be swept away by the tempest in Jerrys heart.

His extra duty finished that night, Jerry marched with strange deliberation into the mess-hall, with his banjo. He played till his fingers were sore and blistered; he sang till he was hoarse. It was a safety-valve for emotions under dangerous repression.

As the afternoon following his visit to Disbrow wore lazily to twilight, Jerry sat on his bed and pondered one burning question: *How?* He knew the watchfulness of Mr. Jessup. He knew that discovery would certainly remove him from all chance of seeing Jo. Her window was less than thirty yards from his own—both facing the bay. But there was Jessups too; and a word, a suspicious call, would bring quick discovery. During those times that official business called Mr. Jessup to the office, it was of signal interest that the bellicose Hornby loitered near. Hornby watching *her!* But *how*, he worried, how to get some word to her? Abstractedly, he listened to a phonograph in one of the houses. A mincing, nasal voice was lamenting something in a watery ballad. It annoyed him. He wandered if Jo heard it, too, and was annoyed. Then— why hadn't he thought of it before! The banjo—a song—his words, any words! She'd hear him and, perhaps, answer! They were all accustomed to his playing now, and would pay no attention at this hour. And least of all would Jessup listen.

He sat by the window and struck several chords. Then he sang an army song. By now she must be listening, he reasoned. So—he played odd chords and, inventing an outrageous melody, sang this shocking lyric:

"Oh, can, oh, can you get away
And meet me anywhere you say
This e-vening? I go on doo-ty at eight,
So do not say too late—er, Alabammy."

He stopped, breathless—as much from creative effort as from excitement and fear of discovery. No sound. The stillness was rather awful after this charivari. Then her voice came in his window. What was that? "Annie Laurie!" He waited, listening, tense. He waited, not appreciating that she sang "Annie Laurie" very beautifully. Then, to the same old melody was added this verse never before heard:

"I'll be there at seven-thirty,
At seven-thirtee-ee;
Where we were the other day-ee—
Tra-la, her promise true."

"Jerry, it's risky!" were her first words, on running up to him, where the ledge concealed them from the station.

"Hang the risk!" he replied warmly. I *had* to see you Jo!"

"And I've wanted to see you, Jerry—oh, more than you'll ever know! But if father learns of it, or Hornby—"

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"Jo, you don't like him, do you?"

"Of course I don't, silly! But—oh, it's hard to explain—father wants me to marry him—"

"Father thinks it would keep me here at the station, with him. He doesn't understand, poor dear." She looked up into his worried eyes. "Jerry, why are men so stupid?"

Stupidly he asked: "But what has your father against me?"

"*So* stupid," she repeated. Then nervously: "Don't you see? He's afraid that maybe I—I—Oh, Jerry, you're worse than he is!"

He stared beyond her to the bay, where the night crept in from the sea. He knew, in that moment, he could hold her to him, kiss her, and tell her what had filled his heart. But he only stared, restrained by some unaccountable force. He remembered watching a ship, the first he had seen in the bay, set her riding-lights in the gloom. Patiently she closed her eyes, companion to his silence. Thus they stood; and humble in the first realization of their love. Then the force that had restrained him took form; it was Disbrow's words: "Consider now: do you want to condemn a lovely creature like her to *your* earnings?"

"Jo," he said abruptly, "we can't do it, that's all. We can't do it. I'm a pauper. It wouldn't be fair to you."

"Don't you know I've thought of that?" she asked quietly. "I believe in you, Jerry; that's enough."

Still he paused, fearful, uncertain. She, the girl, intuitive mature dominated. "Jerry dear we *must* leave here. I've stood it as long as I can. It's no place for you. I can help for a while—nursing. We're not even moving here; we're just marking time. Let's begin to build our lives, together. Jerry, take me away with you—now!"

Strength, confidence, determination pulsed through him. She was right. He was a blind, hesitating fool. With her he could begin real things. . . . It was nearly dark. A cold star shown unblinking over the dull hulk in the bay. His eyes fixed on the quivering silver of its reflection, he said: "I will, Jo! We'll go right away—together."

Then, simply, he kissed her.

Here their new world crashed and sent them hurtling through dizzy space. A voice, thick and menacing, had said: "Miss Jessup, your father wants to see you at once! Martin, you're to report to your room till further orders!" It was, of course, the bellicose Hornby.

After a sleepless night—sleepless with the certainty that Jo would suffer on his account—the ax of Jessup's justice descended. It was, perhaps, sharper than Jerry had anticipated. A terse order directed him to "proceed at once" to the company's repair-ship Marius, to relieve the ship's operator, who was to go on sick-leave. It was the ship he had seen in the bay. A cable, fouled by a trawler, had brought the Marius to Ballinskellig's the day before. A request to the station for a relief operator had made things very simple for Mr. Jessup. It was all quite legitimate. It was uncannily so. Even Mr. Jessup sensed this.

The Marius was one of those ships that seem condemned to unending servitude. She had been battered and shaken in the wrath of generations of storms. She was blistered and scarred. She had even survived four years in submarine waters to be continued in creaking bondage to the cables. She was unsightly, patched, stinking. Her decks were cluttered with cable-gear; and what space remained was entirely needed by Captain Tunby—the largest man that Jerry had ever seen, and quite the most remarkable. An outrageous beard bifurcated by the wind, swung coarse and tangled and gray against his shoulders. His voice might well have served as his foghorn. Jerry felt that the ship must list to what side its skipper moved. But Captain Tunby was a good commander; as violent in jest as he was in fury; and fair with his crew. His eyes, twinkling and blue, surveyed Jerry with open approbation. He bellowed a welcome and assigned him a tiny cabin aft from his own. Then he outlined his simple duties of "cutting in" on tested cables.

Jerry asked how long he might expect to remain on the ship. "God knows!" roared Tunby. "It's none so easy to get an operator from the station. I don't understand old Jessup being so damned obliging with you! To tell the truth, my regular man's pretty sick. I may not get him back at all."

At eight knots, sweating and groaning beneath the sun, the Marius left Ballinskellig's; left the station, Jerry's friends—and Jo. Here was loneliness which the novelty of this strange shipboard did not palliate. The station and its bleak surroundings were much to be preferred to the Marius at sea. There was no work for him that afternoon. He passed the time astride a forward winch, staring at the open sea, and worrying—for Jo. If he ever again met Hornby, that worthy would not escape so easily. But what would that accomplish? . . . A crushing realization of his absolute impotence fell like a burden on his shoulders. And after all, he mused, he had only himself to blame.

He had dinner with the captain and watched the latter eat with something of awe. The giant had a talent for tossing for or five spoonfuls of food into his mouth, snapping it shut, and swallowing without apparent mastication. He then repeated this fascinating process until great dishes of food had disappeared into his elephantine body. It was noisy magic, but magic none the less. He once interrupted the operations to chide Jerry for his lack of appetite. He followed the remark by generously gobbling all of Jerry's food.

He then insisted on teaching Jerry a childish game of cards. He was passionately fond of this pastime, and told Jerry, "We'll play this every night," which, under the circumstances, was not debatable. When he won, he bellowed his delight; and if he lost, he bellowed just the same, and genially insulted himself with graphic and salty oaths.

(*To be Continued*)

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Why Super Broadcasting Means Better Service

n Address by David Sarnoff, Vice-President and General Manager, Radio Corporation of America, at Broadcasting Station KGO, Oakland, California, Delivered Sunday Evening, October 26th

OUT of the mists of opinion that becloud the rogress of the radio art one fact stands out in clear erspective. The march of progress must lead to ne same destination, and its final objective must e the home. Without that marvelously sensitive nechanical ear—the broadcast receiver—which ranslates electricity into sound, the mightiest broadasting station would be less effective than a whisper. Without the millions of broadcast receivers ow in use in the United States radio transmission vould be an abortive art. The broadcasting station, be it weak or powerful, must serve primarily hrough the ear.

Yet the problem of what constitutes progress in adio too often is discussed from the standpoint nly of reception, or only of transmission. The est receiver in the world cannot make the signal manating from a weak broadcasting station clear nd satisfactory, while the most inexpensive reeiver in the home is made immeasurably more effective by a good signal from a more powerful transmitting station. Thus progress in radio necessarily means progress both in broadcast transmission and broadcast reception.

Nor need the problem of interference stand in the way of better broadcasting, for the Third National Radio Conference has wisely recommended that high power broadcasting stations shall be located outside and at some distance from populous centers. The effect of location can best be illustrated by this fact: The broadcast station of the present one-kilowatt type, located within the city, emits a signal more powerful in its neighborhood than a signal received in the same neighborhood from a station fifty times as powerful located twenty-five miles from that city.

Electrical devices in the home and power transmission lines may, on occasion, give rise to electrical disturbances which interfere with the reception of weak radio signals. It is not feasible nor desirable to disrupt the entire electrical field in order to get such minor electrical disturbances out of the air, and some other method of avoiding the trouble must be found.

It will be noticed that in every one of the cases of interference with reception just mentioned the crux of the situation lies in the feebleness of the signal, particularly the signals from distant stations. The problem in brief is to produce a strong signal from distant stations, and that means super-power broadcasting. At once the detrimental effects of natural and artificial electrical disturbances are largely eliminated.

The remedy is obviously super-power broadcasting.

In rendering a service to the public, it is desirable that this shall be a steady and dependable thing. If good signals are clearly heard in the winter, the transmitting station should similarly produce an acceptable signal in summer. Daytime service and night service should be acceptable even for considerable distances from the broadcasting station. In order that this may be achieved, sufficient power has to be provided at the transmitting station to meet the more difficult conditions of daytime summer reception as well as the comparatively easy conditions of night time winter reception. Higher power broadcasting provides the ready means of doing just this, and introduces into broadcasting a hitherto unobtainable degree of stability and all-year-round evenness of reception.

By doing this, super broadcasting will carry the best of the programs originating in the great cities of the United States into practically every home, winter and summer, and day and night. Once a reasonable number of super-broadcasting stations are in successful operation, every listener will get reliable service at any time from one or more of them, and most listeners will have a considerable degree of latitude in choosing the program to which they will listen. Furthermore, those listeners who are within the normal range of the lower power purely local station can, when they so desire, listen to its program. Super-broadcasting will not interfere with this last because the super-power stations will be so located that the signals they produce in the populous centers in their neighborhood will not be excessive.

At the same time, the economic basis for high-grade broadcasting will be very firmly established by the super-broadcasting station. It is clear from even a brief analysis of the situation that nationally interesting programs can be sent out economically only from stations of such power that they reach vast bodies of listeners. Many of the smaller stations are obviously better fitted to carry out the useful but different functions of catering to special local groups and to sectional tastes. The super-broadcasting station is, however, a much more expensive project to establish. Reaching, as it will, large groups of listeners, it will be able to select the best program available.

The radio industry, insofar as broadcast receiver sales are concerned, is the direct beneficiary of broadcast transmission and could not continue if broadcast transmission ceased or were lowered in quality. Yet it has not hitherto been possible for more than a few isolated concerns in the radio manufacturing and sales fields to furnish their share of broadcasting either by the direct operation of a broadcasting station or by contributing toward the program expenses of other broadcasters. It is simply out of the question for the radio industry to attempt impartially to support the five hundred or more miscellaneous stations which now exist in the United States. Nor is this necessary, since many of the smaller stations are run for seasons which satisfy the owner that he is getting a return from his investment. The super-broadcasting stations will have as their sole object the improvement of radio broadcasting, with all that this

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implies, to the listening public and to the radio industry. Super-broadcasting will deserve the sanction and support of the Government, the public and the radio industry itself. There is little question in my mind that, once the physical agencies for super-broadcasting are in existence and have proven their value to the public, the radio industry will co-operatively support this agency which is its life-giving force. Super-broadcasting will thus provide for the first time a means whereby the radio industry can effectively co-operate in broadcasting.

I regard super-broadcasting as a stimulating form of competition to other systems of national broadcasting. In providing an effective substitute for wire line networks connecting a multitude of low-power stations, it acts as an alternative and additional method of providing entertainment and instruction to the people at large. I hope that wire line networks and radio relay systems for interconnections of broadcasting stations will be fully developed, side by side, with super-broadcasting, for I think that such parallel lines of development will react favorably on each other and ensure the speedy production of equipment and methods for general use embodying the best of these systems or possibly continuing all of them.

The provision of programs for the super-broadcasting station of the future is also going to be a competitive matter. Individual super-power stations will compete with each other for pre-eminence and favor in the air. Program agencies will no doubt be prepared to furnish specially trained talent to the radio broadcasters, and these agencies will, like the various press associations, give the public these advantages which spring from healthy rivalry. Freedom of the air can be maintained under such conditions, where at least three fundamental methods of transmission (i.e., (1) local, (2) interconnected, and (3) super-power stations) compete with each in furnishing nation-wide broadcasting and numerous program-producing groups similarly attempt to secure the favor of the public and of the broadcasters.

The problem of super-broadcasting, like any other department of progress, will be settled upon the principle of public service. Ultimately, performance, not opinion, will determine the direction of progress in the radio art. Speakng for the Radio Corporation of America, I can say that we are ready and willing to demonstrate the measure of service that super-broadcasting can render by erecting an experimental station, suitably located, that will prove the promise which super-broadcasting holds out to the public.

Fred H. Jung, manager of the Western Union Telegraph Company, Franklin, Ohio, in remitting to cover his subscription writes: "I am glad you renewed my subscription as the Age is always welcome on my desk. It keeps me posted with the doings of the profession."

ADDRESS OF H. B. THAYER

President of the American Telephone and Telegraph Company at the Eleventh Annual Meeting of the Telephone Pioneers of America, Chicago, Ill., Oct. 9-11

We are pioneers, and that means that we have been at least twenty-one years in this service. It does not mean that we have outlived our usefulness, even if we have been in the service twice twenty-one years, as some of us have. We don't any of us like to have that expression, "outlived his usefulness," applied to us. However selfish a man's aims in life may have been, and however successful he may have been in accomplishing them, there is inborn a desire to have and continue usefulness, and that is probably because there is a feeling born in us that we have lived in vain if we have come and gone without having made any impression, without having had any influence. And, if we have had an influence in our community or in our family or on our neighbor or fellow-worker, it is an influence on the world, even if in an infinitesimal degree. And we all like it. There isn't one of us who would not like to feel that after he is gone someone would say, "He was a good scout. He helped me by advice or by a friendly word or perhaps only by example. He played the game straight." None of us are so hard-boiled that he wouldn't like to look forward to that.

Influence and helpfulness are kinds of usefulness which are always possible. That possibility we never outlive. There are about 7,800 members of this organization. If all who are eligible to membership were members we would be about 3½% of the employees of the Bell System, but we have a usefulness in the directions I have mentioned away out of proportion to our numbers, because we are the Old Guard. Let's help the young people to start right and keep right.

Young men and young women are not machines. They have hearts and brains. If they keep their hearts and brains out of it, their work is drudgery. If they put their brains into it and study it to the extent of understanding why and what they are doing, they will participate in the joy of accomplishment, and there is no joy greater. They will realize what they are contributing to a great public service, and enjoy the enthusiasm which goes with that realization We started when it was easier to get a picture in our minds of the whole thing, and we have enjoyed our work. Help them to get the picture by encouraging them to think. The people working in this business are exceptional people with exceptional opportunities. This business has an appeal to the imagination. It will not be hard to stimulate in them the interest in the business which you have enjoyed—the interest in playing the game.

Encourage them to be good citizens. You may say that that is a private matter, and it is, but it is also a public matter and a family matter and a business matter. Our happiness depends upon our

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amilies and friends, our country and our work; nd because the conservation of lives and liberties nd the fruits of our labor depends upon our gov-rnment, that is something to which we should apply our brains with more than casual interest.

There is too much unthinking selfishness. This s a great nation of workers, in specialized indus-ries. If you did not think you would say that you would like to get your clothing and your houses and your shoes and your food for nothing, but if you did, the clothing makers and carpenters and shoe-makers and farmers would have no telephones and you would be out of a job. The prosperity of one trade or one section makes the prosperity of an-other. As classes or as sections of the country, bar-ring temporary fluctuations, we can all be prosper-ous or we can all be poor. There used to be a dis-tinction between capital and labor. Everybody can be a capitalist. That is what America means—the land of opportunity. Many are, and the proportion steadily increases. But, admitting a distinction, capital cannot be prosperous when labor is not, be-cause in this country the laborers are the buyers and labor cannot be prosperous when capital is not, because then industry slackens.

The present is a time when it is necessary that a good citizen should think and should vote as he thinks. There is a certain document designed, as it states, "to establish justice, insure domestic tran-quillity, provide for the common defense, promote the general welfare, and secure the blessings of liberty." After the people of this country had fought for and achieved their independence the wise men of the country, assembled for that purpose, labored to produce an agreement between the states for a government which would preserve their lib-erties, insure the peaceful enjoyment of their lives, and safeguard to individuals the fruits of their labors. It was to hold for the people what they had bought with their blood. Their agreement was accepted and became the foundation of our form of government. It has carried us through the dan-gers which beset a young nation. Under it we have become a great nation and a strong nation, morally and materially. It is a rich nation, but what is better, the riches are more evenly divided than in the other great nations, the opportunities for ad-vancement and the enjoyment of comforts of life are more evenly distributed. There has, so far as history tells us, never been a nation in which the average standard of living has been as high as it is here now, so that, judging by results of nearly one hundred and fifty years, we may say that the work of those wise men was good work. It probably was not perfect, but we should think with all the brains we have about any proposed change in the document they produced—the Constitution of the United States—which involves any fundamental change in our form of government.

We all know that our government is not perfect, but perhaps the trouble is not in form but in opera-tion. It is my own belief that a large part of the trouble is with us as citizens, and it is a trouble that is our plain duty to correct. We have the privilege of voting. It is more than a privilege, it is a duty to ourselves, our families, and the coun-try. It is a duty that we should exercise that duty conscientiously and intelligently. With reference to a candidate for a legislative office, that is, for a Senator or representative in either the Federal or State Legislature, we should ask ourselves: "Is he a man in whom I can have confidence as my representativve to make the laws, for the protection of my life and the lives of my family and to safe-guard to me and to them the fruits of my labor?" And with reference to an executive—a President or a Governor—we should ask: "Is he a man whom I can trust to fairly and impartially enforce the laws?" Voting is a sacred privilege won by the blood and sacrifice of our forefathers. Unless we conscientiously and intelligently, so far as we are able, exercise that privilege, we deserve all that we get of bad government.

Facts About the Telephone

There is more than one telephone for every three inhabitants in Atlantic City. N. J.

There are more telephones in use in the single State of Pennsylvania than in France, Italy, Russia and Austria combined.

Among the forty-eight states that make up the United States of America, there are five each of which has more telephones than the entire continent of Asia.

Dallas, Texas, with about one telephone for every five persons, now has approximately as many tele-phones as the entire Republic of Mexico.

Nine office buildings in New York City have, in the aggregate, more telephones than the whole of Peru, Ecuador, Colombia and Paraguay combined.

In the whole world there are just twenty-five cities that have over 100,000 telephones apiece. Six-teen of these cities are in the United States.

Cablegram Mutilations in India

THE Bengal Chamber of Commerce has com-plained to the Director General of Posts and Tele-graphs that cablegrams passing between India and the United Kingdom are mutilated more frequently than formerly. One firm states that 20 to 25 per cent of the messages are mutilated, and another that that occurs in every second or third message. The cable companies state that the mutilations are traceable to the land lines in India.

Modern Names

Mrs. Johnson—"Ah thought you-all said you was gwine to name your new baby 'Victrola,' but Ah hears you-all done make a change."

Mrs. Moses—"Yes, Ah expected it would be a girl an' Ah had decided to name her 'Victrola,' but she turned out to be a boy, so Ah done name him 'Radio.'"—Ex.

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Plymouth, Ill., Man Unearths Ancient Pewter Full of Coins Dating to 1856

GEORGE E., familiarly known as "Old Farmer" Lawton, is a retired business man who for the past few years has been living the dreamlife in the village of Plymouth, Ill., and incidentally looking after his farm interests just outside the city limits. He was passing through a wooded pasture, mingling with nature and mixing up with the happy birds and squirrels when he saw something that glistened under the roots of a large oak tree near a small brook where the heavy rains had washed out the soil. Securing a pick, "Old Farmer," who had spent forty years in Colorado, soon had the object unearthed. It proved to be an ancient pewter teapot of a design in use a century ago.

The teapot contained $91 in American gold in twenties, tens, fives and dollars. These bore dates from 1832 to 1865. There were ten dollars in silver quarters and fifty-cent pieces, dated from 1823 to 1856, and a half dozen of the old large American copper cent pieces, dated from 1828 to 1851. There were also a few English copper pieces, some bearing dates back into the seventeen hundreds and an English silver crown, dated 1847. The most interesting piece is about the size of an American ten-dollar gold piece, evidently brass or bronze, and is a souvenir of the coronation of Queen Victoria, showing a picture of the queen encircled by the letters in her name. On the reverse side appears a gallant knight on horseback and the words "To Hanover 1837."

As no coin is dated later than 1856, the pot must have been buried about that time. The majority of the early pioneers who settled in this western central Illinois, known as the "Military Tract," in 1835 to 1840 were a class of sturdy and fairly well-to-do immigrants with large families who migrated from eastern states in wagons, the husbands being allotted farms by our government in recognition of their loyal services in the Black Hawk war and War of 1812.

Local histories show there was very little money in circulation in these parts until the railroad made its appearance in 1856. Up to then farmers raised their own necessities of life, hauling any surplus 25 miles to the Mississippi river, where it was exchanged for store clothing or luxuries.

The fact that the teapot contained some English money would indicate that whoever buried it had at some time come from Europe and retained a few pocket pieces.

The most plausible theory is that it was buried by one of the employees engaged in the construction of a new railroad through Plymouth. The company was two years, 1854 and 1855, putting in a very deep fill and building a large stone bridge over a creek a mile south of this village. There a graders' camp was established and many Irish, lately from the old country, were employed.

A family of the name of Shilds kept the boarding house. Among their boarders was one known as "Big Mike," a most industrious and parsimonious kind of fellow. On pleasant Sunday afternoons he would take the Shilds children up the creek about a mile, always stopping at one particular place, about where the Lawton farm is now located. There he would lounge around on the grass while the children picked flowers or gathered nuts.

In celebrating the completion of the railroad the Irish colony got into a pitched battle with knives and shillalahs. "Big Mike" was disembowled. Staggering into the boarding house, he dropped dead in front of Mrs. Shilds. His murderer followed, packed his few personal belongings in a red bandanna and walked off down the railroad, never to be heard of again. The excitement and shock caused Mrs. Shilds to give premature birth to a child that night. The next day "Big Mike" and the babe were placed in two home-made coffins and buried at the old Haggard burying grounds, just west of town, and the sad event soon forgotten. The laborers soon afterward migrated and their little town of huts was abandoned.

The Shilds family established a home in Plymouth and never gave up their belief that "Big Mike" had buried his savings in some wild spot. Mr. Shilds and his dog spent many days searching for the buried treasure trove. In 1868 the Shilds were known to have suddenly come into possession of considerable money in some mysterious way. Disposing of their humble home, they journeyed back to their childhood home near Hagerstown, Md. They only tarried there a year or two when they again came West, settling at Marshall, Ill., where Mr. Shilds was killed in a runaway accident and the eldest son, Samuel, met his death while railroading out of Terre Haute, Ind. The daughter, Fannie, made an unhappy marriage and soon died of a broken heart. Then in the late Seventies, the younger son, Merritt, who had gone to railroading in Kansas, was sent home a corpse. In 1892 the mother, then past eighty, wrote Plymouth friends of the sad ending of her once happy family and how they were all then quietly sleeping in the Effingham (Ill.) cemetery, where she soon expected to follow them.

With these sad events still fresh in his memory, Mr Lawton is greatly worried over his find. We know the same metal is time after time remelted, recoined, restamped and thus maintains its perpetual youth.

"What assurance have I," said Mr. Lawton, "that some of these gold pieces that have been buried in this teapot for over half a century were not at one time worn in rings by Cleopatra, or used in the golden targets of Solomon? Or that some of these silver pieces did not form part of a pirate's booty from a scuttled galleon of the Spanish Main? For aught I know it was current money in Nine-veh and Babylon. Perhaps some of it is one of the pieces paid by Abraham to the children of Heth for the double cave that looked towards Mamre, or

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ne of the pieces for which Judas betrayed the Master. The Gospel tells us that before Judas Iscariot went out to destroy himself in his great remorse at having betrayed innocent blood he cast down the thirty pieces of silver before the chief priests. These pieces were shekels of the coinage of Simon, the high priest, which Antiochus authorized him to issue. They bore the pot manna and the flowering rod of Aaron, and he to whom they were given knew that they were the price of blood and was afraid and great tribulation came to him that bought and sold with the money of Judas.

"How do I know," continued Mr. Lawton, "that the sad ending of the Shilds family was not caused by them finding a portion of this hidden treasure containing more or less of the silver originally in the thirty pieces paid to Judas? How do I know that some of this that I have resurrected does not contain more of it?"

Late figures from Washington show that the United States in 1922 produced 56,240,000 ounces, or about 26 per cent of the silver output of the mines of the world. But in 1860 our share of the world's production was only 116,016 ounces, or a fraction of 1 per cent. So that previous to 1860 practically all our silver money was coined from silver brought from other countries.

With all these facts staring him in the face, Mr. Lawton, a most loyal American citizen, tracing his ancestors back to New England in 1630, says he will take no chances by retaining these old coins in his possession. Nor will he pass them off here in the peaceful United States. But after they have been on display at one of the local banks he intends sending them to the Denver mint with the request that they send him their equivalent in good clean American-mined metal money. They can remelt and recoin these "tainted pieces"—if such they may be—into money they are occasionally coining for Old Mexico and some of the South American republics that are always at war and apparently never happy only when in trouble.

Change the Name of Radio Central

By Radio Pioneer

At the time the Radio Corporation of America's large multiple transmitting station at Rocky Point, Long Island, was completed, in 1921, there was much discussion relative to adopting an appropriate name for the station. Many names were suggested, and of these the one proposed which most nearly signified the purpose of the big station (Radio Central) was adopted.

The passing of time—four years since the station was named—has disclosed that there is room for improvement in the name of the station.

The name "Radio Central" is no longer appropriate, if it ever was that. "Radio Central" carries no suggestion of location. The station itself, moreover, is not the Central. This it at No. 66 Broad Street, New York, so far as the Radio Corporation is concerned. Radio people abroad refer to the station as New York, Rocky Point, or Long Island; rarely as Radio Central.

The station is but one-half of a system. It sends but does not receive; therefore it is not a Central. Further, since the advent of radiophone broadcasting the word "radio" has come to have a new meaning. The public thinks of radio in terms of headphones, loud speakers and of station VVZ, etc. The British were wiser in retaining "wireless" to designate telegraphy, and "radio" to designate telephony.

The big project on Long Island is entitled to and worthy of a name of its own; a name which has some chance of international recognition; a name which will avoid confusion with that of other stations in existence or to be built in the future, and which will be sufficiently distinctive permanently to imply location.

The writer proposes the name "Nally" in honor of Edward J. Nally, the father of modern radio in America. The name Nally is recognized throughout the world as symbolic of what America has accomplished in developing radio from a small stock-jobbing enterprise to a great international commercial undertaking of world-wide magnitude.

If given the new name the big station will have its purpose and its location embodied in one short word that will be used, without excuse for the employment of New York, Rocky Point or Long Island. The name will be distinctive, and the station is entitled to the honor.

Institute of Radio Engineers Nominations for Officers, 1925

The following have been nominated as officers and managers of the Institute of Radio Engineers for the year 1925: President, Lloyd Espenschied and J. H. Dellinger; Vice-President, E. H. Armstrong and Donald McNicol; managers to fill vacancies, A. E. Reoch, Melville Eastham, A. H. Taylor and George E. Burghard. The ballots are now being distributed to the membership.

During the past year large gains have been made in membership by the Institute. Three thousand copies of the Institute's PROCEEDINGS are printed and distributed bi-monthly.

Charles O. Pierson Honored by Commission

After a service covering nearly fifty years, military and civil, the Civil Service Commission has approved the retention of Charles O. Pierson, auditor, Washington-Alaska Military Cable and Telegraph System of Seattle, for two years, effective December 22, on which date he would be eligible for retirement at the age of seventy years.

Maj. Gen. Charles McK. Saltzman, chief signal officer of the Army, in his recommendation to the commission for Mr. Pierson's retention, paid him the tribute of stating that he had filled his present position in Seattle since June 19, 1913, with exceptional satisfaction, and also testified to his value as a public official.

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Mind Training for Health and Success

By W. H. CANDLER

(Continued from page 512, November 16th Issue)

WHAT IS CONCENTRATION?

Concentration and Memory are so closely allied that it is hard to distinguish them.

Whether writing, preaching, farming, selling merchandise, fixing a watch, pleading a case at bar, or discussing the Prohibition Law with the neighbors, the Conscious Mind is constantly calling on the Sub-Mind for data to meet all demands. Frequently, when there is no real information on the particular subject under discussion, the Imagination will improvise and supply some anyway. This probably accounts for the volubility of some people who know so little and talk so much. They place implicit belief and confidence in the vagaries of their imagination. After repeating a yarn several times they come to believe it themselves. They soon acquire the fabricating habit; it is easily acquired and, strange as it may seem, they least suspect it, and are astounded and gravely insulted when they make the painful discovery that others do not believe what they say. There isn't a small town anywhere that doesn't have its chronic liar. Every big yarn he tells he actually believes to be true, and he enjoys telling them. To be a good liar one must believe one's own, and this is done by or through auto-suggestion, repeated to the Sub-Mind until the habit is established. One then becomes false, not only to others, but to oneself; and no man, I care not who he is, can ever succeed at anything so long as he condones and encourages this obnoxious habit. I have not seen one of these fellows occupying a big and responsible position.

Concentration is a focusing of the consciousness upon one thing. I believe it was Darwin who said that hardly any other faculty is more important for the intellectual progress of man. Sir W. Hamilton said: "Concentrated consciousness is attention." Cowper expressed it cleverly thus:

"Knowledge dwells
In heads replete with thoughts of other men;
Wisdom in minds attentive to their own."

Bringing the consciousness to attention is a faculty which, like other faculties, depends largely upon training. That Memory plays a very conspicuous part in this process is obvious.

THE MEMORY PROCESS

No mental faculty has been so little understood and so much abused, I think, as Memory. It has furnished a profitable field for exploitation by pseudo-scientists, who claim to have discovered the secret of Memory Training. Nearly all their methods consist of cramming the mind with uninteresting and useless data, with the idea that by so doing the memory will be strengthened. They work on the theory of the old-time school teacher who made us memorize poems and other things for this purpose.

Training the Memory is like trying to train a thought, it cannot be done. The source may be trained; that is, the mental process which we term memory. Memory is the ability to refer to our mental files and bring the desired information across the threshold of consciousness; then by bringing the consciousness to attention, we have both Concentration and Memory, a process which may be influenced by the emotions, the Reason, or Interest—or all. This may be aptly illustrated by referring to the hundred letters you receive daily. Suppose you read these letters and throw them about your office carelessly and, in a few days or weeks, there comes an urgent demand for an important paper or letter. Then, nervously, impatiently, you begin searching for it, and you continue until you find it or give it up as a bad job. This illustrates unsystematic mental processes, and shows why some people's memory is faulty. Now if, after reading your letters, you file them under their proper headings, you experience no difficulty in finding them afterwards; you also avoid wasted energy and interruption of concentration.

There is a difference in Memory and Recollection. The latter, I may easily define as an aid to Memory by association of ideas and facts, as when something is recalled by an effort made for the purpose. This method is resorted to by most people, but those who think or meditate with a specific purpose, have trained their minds to be susceptible, ready, and retentive, and for this reason, are interested in a greater variety of things, which gives them a consequent broader understanding. There is no system of Menmonics, or Memory Training, that can substitute for this understanding.

We do not forget the things that interest us or that we understand. But, unless we are interested or have some understanding, our memory pertaining to that particular thing is poor, indeed. A baseball fan easily remembers the names and records of prominent players for years back. The incidents connected with their careers he recalls by association. If you are interested in your vocation, avocation or pastime, you recall, without difficulty, all incidents connected therewith. Your chief interest is the center of your mental activities, and is the determining factor in your life.

WHY OLD PEOPLE'S MEMORY FAILS

The greater number of things you are interested in, the better is your memory pertaining to them. Memory is the mental process of delving into the Sub-Mind with data, facts, ideas when needed.

The keener your susceptibility, the more interested you are in human affairs, the more attention you give to all objects of sensation, the more easily you will remember them. The more that reflective coexists in your mind with perceptive power, the more permanent will be the impression. The old, losing interest in recent events, as their mind and body decay, complain of difficulty in remembering them. But, have you ever seen a person

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so old that he could not recall, with minute precision, the interesting incidents of his childhood, his school days, his first sweetheart?

When a man says his memory is failing, he acknowledges that he is losing interest in the things of life and life itself. This is most particularly applicable, I believe, to the man who retires after a life of strenuous business activity. People, as a rule, do not live long after they lose interest in things. The educated man lives longer than the uneducated. His knowledge and understanding of past events give him a bigger and more intense interest in current developments and events. The average man of today is better educated than the average of the past, and no doubt but that this accounts largely for his longer life average; and too, he has more to interest him; daily newspapers, magazines, Sunday Supplements, books phonographs, radios, moving pictures, vaudeville, tennis, golf, baseball, and hundreds of other interesting things that the man of a generation or two back didn't have. So long as a patient's interest may be aroused, no matter how serious his malady, the doctor does not lose hope.

Since interest is paramount to a good memory, it would seem that the plausible solution consists of cultivating a wider or deeper interest in a greater variety of things, which should include, I believe, worthwhile things, and as there are so many, it is quite impossible to enumerate them. In this connection I have in mind a man who recently came under my observation. This man had but one big interest in life and that was self-diagnosis. His symptoms were variable. From gall bladder disturbance to cancer of the stomach; from hardening of the liver to softening of the brain; from tuberculosis to Bright's Disease. In short, he knew and had every pathological symptom. When he came under my observation he was just about "all in," and didn't care if he died tomorrow.

In addition to general directions for mental training, I suggested that he read Thomson's Outline of Science, Franklin's Autobiography and any other good history or biography he should happen on to. I asked him to read for twenty minutes the first night, and each night thereafter to add five minutes to his reading time.

It is unnecessary to add that results were very satisfactory. The man is now enjoying good health and life, for he has formed new interests. When he looks at the stars in the sky, he is interested because he understands something about them. Instead of looking in and constantly speculating on his own condition, he is looking out understandingly upon the wonders of Nature, all of which, organic and inorganic; animate and inanimate; terrestrial and celestial; solid, liquid, aerial and ethereal is teaming with wonders and crowded with mysteries and difficulties solving and unfolding every hour. Instead of his mind dwelling upon cancer of the stomach, he is trying to understand something about celestial, atmospheric and geological phenomena; the philosophy of motion and how it is communicated from one body to another; the laws governing the equilibrium of forces essential to the existence and architectural grandeur of the Universe, its worlds, atoms, fluids, essences and LIFE!

Gall bladder symptoms have been replaced with speculations concerning the laws governing chemical affinities, combinations and decomposition. The mysteries of Physiology, the marvels of Pathology, the complexity of diagnoses, the arcana or Materia Medica, in a word, have been replaced by speculations on the original and executive causes of the great facts of gravitation, attraction, repulsion, and impulsion.

Few people rave over Shakespeare at first, or Milton, Dante, Dickens, or any of the great authors or artists. But, by daily association with their works, they soon become devotees, and as they follow these great masters of thought and emotion, they begin to discover new things of absorbing interest, and these are the worthwhile things they will remember.

I have thought that if someone would originate a system of forgetting, he would be a genuine benefactor to mankind. There are so many worthless things we have stored in our Sub-Minds that are a burden in our lives, which we would gladly be free from. Lost loves, dead hopes, thwarted ambitions, foolish mistakes of thoughtless youth, come ensemble, when not wanted, from the murky groves of the buried past to haunt the quiet hour of meditation.

IS NERVOUSNESS A DISEASE OR A SYMPTOM?

Nervousness is superinduced by organic disease. The old idea of diseased, weak, or jaded nerves has been abandoned. What then, is nervousness? Nervousness, primarily, is the result of a mental condition. It is not without cause; in fact, there are so many contributing causes, that to enumerate them specifically, would necessitate a complete inventory of all the mental conditions of every individual who is suffering from so-called nervous disorders. The manifest nervousness of one person may be, and frequently is, identical with that of another, while the contributing causes of the two are as widely separated as the Antipodes.

I believe a safe and sensible definition for nervousness is this: Failure of the Conscious and Sub-Conscious Minds to co-ordinate. Whatever may be the cause of this failure, may be hard to determine, and is immaterial, the result is the same—the only perceptible difference is in degree.

When the two minds do not co-ordinate, work together, the result is a mental dissonance. For example, a skilled violinist cannot produce harmony on an instrument that is out of tune. Discord produces discord as harmony produces harmony. The reaction of mental discord is nervousness. If the conditions by which one is surrounded are discordant, one soon becomes likewise unless one's mind has been trained to co-ordinate under difficulties.

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Therefore, nervousness is the result of mental discord. The remedy consists of removing, so far as is possible, the contributing cause, and the training of the Conscious and Sub-Conscious Minds to co-ordinate under all conditions. Such co-ordination is necessary to health, happiness and success.

If there are disturbing influences in our lives, and there is to a greater or less extent, we must either remove them or adjust ourselves to them. To do this requires mental training, which means also, nerve training. To live in a state of mental turmoil, results eventually in a breaking down of the natural mental resistance with a corresponding nervous reaction with all commonly attendant complications. The nerves do not influence the mind, but the mind influences the nerves, just as the hands of a watch do not influence the watch, but the watch does the hands. Relatively, the watch hands are to the watch what the nerves are to the mind. The watch must be wound every day, and the mind must be trained every day.

SUMMARY

In this discussion of Mental Processes, I have described the functioning of the Will and the Imagination, showing, by illustration, their relation. I described the Sub-Mind and its functions, showing it to be the habit forming mind, but amenable, when trained, to the Conscious Mind or Will, which influences its habits and is in turn influenced by them. We then took up the Will and its functions with relation to the whole mental process as a coexisting unit. We defined and described Concentration and the Memory process and showed that Memory is largely a matter of interest. Then we came to the much mooted subject of nervousness, with which all of us are afflicted, more or less, and described it as an inharmonious mental condition. I have tried to avoid the use of technical terms and to make everything as brief and clear as possible.

Now the question is what have you gained so far that will be of benefit to you? It will be recalled that a certain famous exponent of auto-suggestion, claimed that when the Will and Imagination came in conflict, the Imagination always won out. My explanation shows that such is the case only when the Will and Imagination are untrained. I desired particularly to make this point clear to you. I have not told you everything, for it is a big subject, and to go into each detail would require more space than we have at our disposal. However, I have told you enough to give you a very clear and comprehensive idea of the subject.

HOW TO TRAIN THE MIND

The first necessity for Mind Training is Desire. Without it, nothing can be accomplished; with it, all things are possible.

I assume that you desire, above all things, Self-Mastery; that is, the ability to decide habits you will and will not acquire for the promotion of your health, happiness and success. I shall not attempt the isolation of any of these habits, as that which applies to one applies to all, whether it is freeing yourself from a bad, injurious habit, or acquiring a useful one.

The first thing is to train and strengthen your Will. It should, of course, be Master, but is frequently controlled, directly or indirectly, by the Imagination. So long as such control exists, against the desire, the Will is not Master. You understand that in the matter of habit the Imagination always controls. The Imagination is always amenable to suggestions given to it by the Will, if given firmly and with a purpose. Do not overlook the fact that the Imagination is habit forming and when not subjected or controlled by the Will, does as it pleases.

Begin to form the habit of Will-Mastery. When directed by the Will, the Imagination will help the Will to a complete Mastery. Anything, no matter what it is, persistently repeated by the Will to the Imagination, becomes a reality; therefore, the Conscious Auto-Suggestion that the Will is absolute Master, repeated, becomes implanted in the Sub-Mind and is acted upon. Consequently, all the latent powers of the Imagination are concentrated in making the Will absolute Master. As the Will becomes stronger it becomes more capable. For instance, a man who has smoked for years imagines he cannot quit it, and he doesn't, because he thinks he cannot do without it. If a doctor tells him he must discontinue the habit, perhaps he will, but he does it laboring under the belief that it is hard for him to do so, and it is difficult for this very reason. He must off-set the habit that he cannot do without smoking with the habit that he can. He first must change habits in the Sub-Mind. The only part played by the Will is to persistently give this auto-suggestion. The Will must not be used in trying to stop the habit in any other way; to do so serves only to defeat the object. The idea of forcing oneself to do something if one doesn't like to do it, is wrong. The right way is to get the habit of liking to do it, which is easy, comparatively, if one goes about it the right way.

THE AUTOSUGGESTION HABIT

If you were going to build a house, a bridge, a flying machine, or a saw-mill, you would first take inventory of what you have and make a list of the tools and materials needed. Now in forming the Auto-Suggestion Habit, first take stock of yourself; what you need and what you do not need; that is, what you need to get rid of in the way of bad habits which handicap you, so that you can acquire good and useful habits.

The Will is your foundation, hence it behooves you to lay your foundation carefully. Upon retiring, fix in your mind the thought that your Will is Master, and repeat the following suggestion to your Sub-Mind, audibly, until you go to sleep: "My Will is Master, my Sub-Mind is helping it to be Master and will obey and carry out its commands."

When you awake the following morning, repeat this suggestion twenty to forty times. Continue this for a week, night and morning as directed, then begin the following suggestion to strengthen your

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Memory:

"I am interested in a greater variety of things and my Memory is getting better and better every day." Follow this suggestion the same way you did the first one for the Will. In fact the same procedure is applicable to all suggestions. You must understand that your belief is not necessary, because, consciously, you have nothing to do with it. Belief is a sub-conscious manifestation. The persistent repetition of the suggestions will gradually establish your belief, but you cannot force it—it is a result.

For example, we will say that you are an inveterate smoker and you want to quit it, but you believe you are unable to break the habit. May be you have previously tried it by using the old method of "Will-Power," with bad results; so bad in fact, that you finally gave it up as a bad job and resumed smoking. Bear in mind, the method I give for breaking this habit is applicable to any and all habits. If it be drinking, simply substitute the word drinking for smoking, and so on, indefinitely.

Do not try to use your will power to stop smoking, as that isn't necessary so long as you desire to stop smoking. However, if you have no desire to stop smoking, but simply want to try this method to see if it will work, it will be ineffective. You must have an earnest desire, that is always paramount. If you haven't the desire, your time and efforts will be wasted, unless you can create a desire. Repeat the following suggestion each night, as directed, until you fall to sleep and twenty to forty times upon awaking:

"I don't need to smoke. I am better off without it. It is easy for me to do without it. I dislike it."

In a few days you will observe that you do not smoke as much as you did previously; soon; that is, within a week or so, you will become indifferent about it. Again I caution you to not try consciously to stop it or to not stop it. The only conscious effort necessary for you to make is to suggestionize your Sub-Mind as directed, and continue doing so until you have absolutely no desire whatever to smoke; it eventually will become very distasteful to you. Then your work is done and you needn't bother about it any more. This may require a week, two weeks, or even longer; it all depends upon you, your desire and ability to persist.

Now, it is entirely unnecessary for me to give you a long list of suggestions to be used to meet your personal needs. You can formulate them yourself to suit yourself. Whatever you formulate, be sure to use the same wording over and over. A very good autosuggestion, one formulated and successfully used by a famous exponent of the art of autosuggestion, and with which we are all familiar. it is this:

"Day by day in every way, I am getting better and better."

I strongly recommend the daily use of this suggestion in the absence of anything for specific purposes.

There isn't much more to be said now, as I think the ground has been pretty well covered. I believe everyone can accomplish what he earnestly and sincerely desires through the use of the methods herein outlined. Autosuggestion is not a cure-all, nor will it take the place of education, but it is a helpful auxiliary. When you are sick, you should consult a good doctor and follow his directions, and in addition, use autosuggestion. It should be used as a stabilizer. The dictionary definition of the word is this: A device, variously constructed, for maintaining the equilibrium, or balance, of airplanes, of keeping them level.

A Romantic Marriage Between the Children of Well Known Electrical Men

THE New York Herald-Tribune of November 10th announces the marriage of Julian K. Sprague, twenty-one year old son of Frank J. Sprague, and Miss Delemar Palmer, seventeen year old daughter of Ray Palmer, president of the New York and Queens Electric Light and Power Company.

It appears that the young couple eloped from the country homes of their parents in Sharon, Conn., and drove by automobile to Brewster, N. Y., where the ceremony was performed by the Rev. Herbert Hazard, pastor of the Brewster Presbyterian Church. The bride and groom then returned to the Sprague home at Sharon and announced their marriage to their surprised parents, who had not been informed of their intention, although the marriage was the culmination of a romance begun when the young couple were children.

Julian Sprague is a graduate of the Hotchkiss School and of Yale University. His father, Frank J. Sprague, graduated from the United States Naval Academy at Annapolis., Md., but retired from the Navy after a comparatively brief term of service to engage in the profession of electrical engineering. He is today one of the best known consulting engineers in the profession and is widely known in electrical circles for his achievements in the electrical power field.

He equipped the first modern trolley railway in the United States, if not in the world, at Richmond, Va., in 1887, and is the inventor of the Sprague Safety System that is in use on the New York City subways. He is also the inventor of the Sprague Electric elevators that are in successful use in the Postal Telegraph Building, New York, and many other large buildings throughout the country.

He had much to do with the installation of electrical power upon the New York Central and New York, New Haven and Hartford Railroads.

At present he is the president of the Sprague Development Company and a member of numerous prominent clubs, including the Century, and the University and Bankers Clubs in New York City.

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EDITORIAL COMMENT

Radio Election Returns Received on Speeding Trains

Radio election returns were served to passengers aboard speeding passenger trains successfully the night following Presidential election day, marking an epoch in the progress of wireless transmission.

Approximately a thousand passengers traveling between New York and Chicago aboard the Twentieth Century Limited on the New York Central Railroad, which ran that night in three sections eastbound and three sections westbound. heard the news reports of the counting of the national voting continuously from 7:15 p. m. until 1 o'clock next morning. The receiving sets were placed on the book-case shelves at the forward end of the observation cars at the rear of the trains, each one manned by an engineer of the Western Electric Company. Except for temporary interruptions and re-tuning due to change of broadcasting stations every person in the cars, which were filled to capacity with passengers from the adjoining Pullmans, heard the election bulletins, broadcasted from a chain of twenty-seven stations. The night was clear and balmy and with the rear door of the observation cars kept ajar the reports were heard distinctly even by the groups on the observation platforms out of doors.

The all-steel cars, the oscillation and swing of the trains around curves and even their passage through tunnels and highest speed, failed to prevent the continuous delivery of election returns of the United Press Association, interspersed with an unusually good musical program originated from Station "WEAF" at New York. At times the Twentieth Century Limited attains a speed of more than eighty miles an hour, in order to make its schedule of twenty hours for the thousand miles between New York and Chicago, but even on these stretches the passengers lounging in comfort like that of a drawing room, heard the voice of Announcer Graham McNamee as clearly as if he were standing in their midst.

In all respects this fast-train radio service was the most notable success yet attained from the prolonged experiments along this line, and with many lessons learned the New York Central officials are now considering permanent installation on their crack trains of radio sets adapted to give news and entertainment programs.

The next service of news bulletins on New York Central trains occured on November 20th, when the first train ran across the $25,000,000 "Cut-off" and great bridge spanning the Hudson River south of Albany, N. Y., when Hon. Chauncey M. Depew and officials of New York, Massachusetts and the Federal government were the first passengers across the bridge and participated in notable ceremonies at Albany. These ceremonies were broadcasted and heard by improved receiving apparatus aboard trains at various points over the 12,000 miles of the New York Central system.

To the credit of radio, it can be said that the thousand passengers aboard the several sections of "The Century" were enthusiastic over the election news service and no complaints were registered by passengers over devoting the observation car to the broadcasting program. One of the several problems of the railroad is in determining whether to operate the radio in the observation cars by means of loud speakers or by headsets adjacent to the individual chairs so that passengers may have quiet or listen in at will.

"Logs," such as are recorded on every ocean voyage, were made of the election returns service aboard the trains. These show that while the westbound trains were on the Hudson Division, at Poughkeepsie, N. Y., they received clear election reports from Station "W.B.Z. at Springfield, Mass. The same westbound trains a little later switched to Station "W.G.Y." at Schenectady and subsequently received better transmission from "W.E.A.F." at New York and finally in the Mohawk Valley got clearly Station "K.D.K.A." at Pittsburgh. Westbound from Buffalo there was a short hiatus, which investigation shows was experienced also by stationary receiving sets in the same locality, but within a few minutes Station "W.T.A.M." at Cleveland was received clearly and maintained for a long distance.

On the eastbound trains, election returns commenced coming just before reaching Amherst, Ohio, and the passengers received from Station "W.T.A.M." at Cleveland, which faded out after reaching Erie, Pa. and until passing Dunkirk, N. Y. reports were received from Station "K.D.K.A." at Pittsburgh. Between Dunkirk and Buffalo Station "W.G.R." at Buffalo was received with perfect results.

The radio receiving equipment used aboard the trains will be of interest to all radio fans. Each set employed a total of nine vacuum tubes. Of these the first six were the "peanut tubes" mounted in the radio receiver. These operate on the double-detection principle in which the incoming signal currents from the loop antenna are first reduced to a lower frequency range, amplified and reduced to audible frequencies. These currents are then further amplified so that their energy can be increased by the almost incredible amount of two million million million times. Yet the power which actually operates the loud speaker was little more than a tenth of a watt. The equipment was Western Electric 6004-B receiving sets (6 tubes) connected with a stand-loop and a 14-A combined amplifier and loud speaker, 6-volt storage battery and 120-volt "B" battery.

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A SPLENDID ELECTRICAL LIBRARY

Hawkin's Electrical Guide contains ten wonderfully helpful and practical volumes, written in clear, concise language, easy to understand, no wasted words, full up-to-the-minute electrical knowledge, which can be applied to problems that come up from day to day. You can carry a number of the books with you until you have mastered the subjects. All subjects are indexed so that you can find the information instantly. Written in the modern question and answer form. It's like having an electrical authority always at your elbow ready to answer any question you ask. 4700 pictures, 3500 pages, pocket size, flexible cover; price $10.00 for the full set of ten books. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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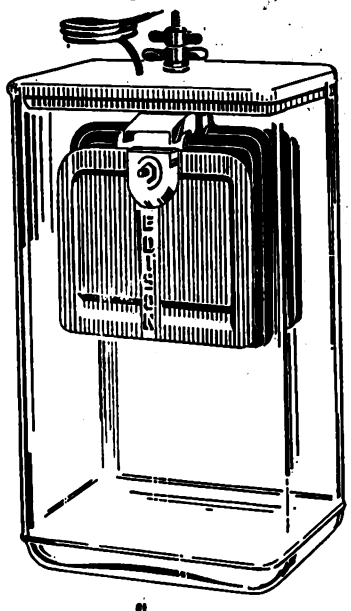

EDISON PRIMARY BATTERIES
for Telephone Service

There undoubtedly is a very good reason why such representative railroads as the Pennsylvania System, the New York Central Lines, the Lackawanna and others are using so many Edison Primary Cells on dispatcher's transmitters, and in other classes of telephone service.

We shall be glad of the opportunity to demonstrate to anyone interested why they have found them so satisfactory and economical.

Thomas A Edison, Inc.
EDISON SIGNAL BATTERIES-PRIMARY and STORAGE
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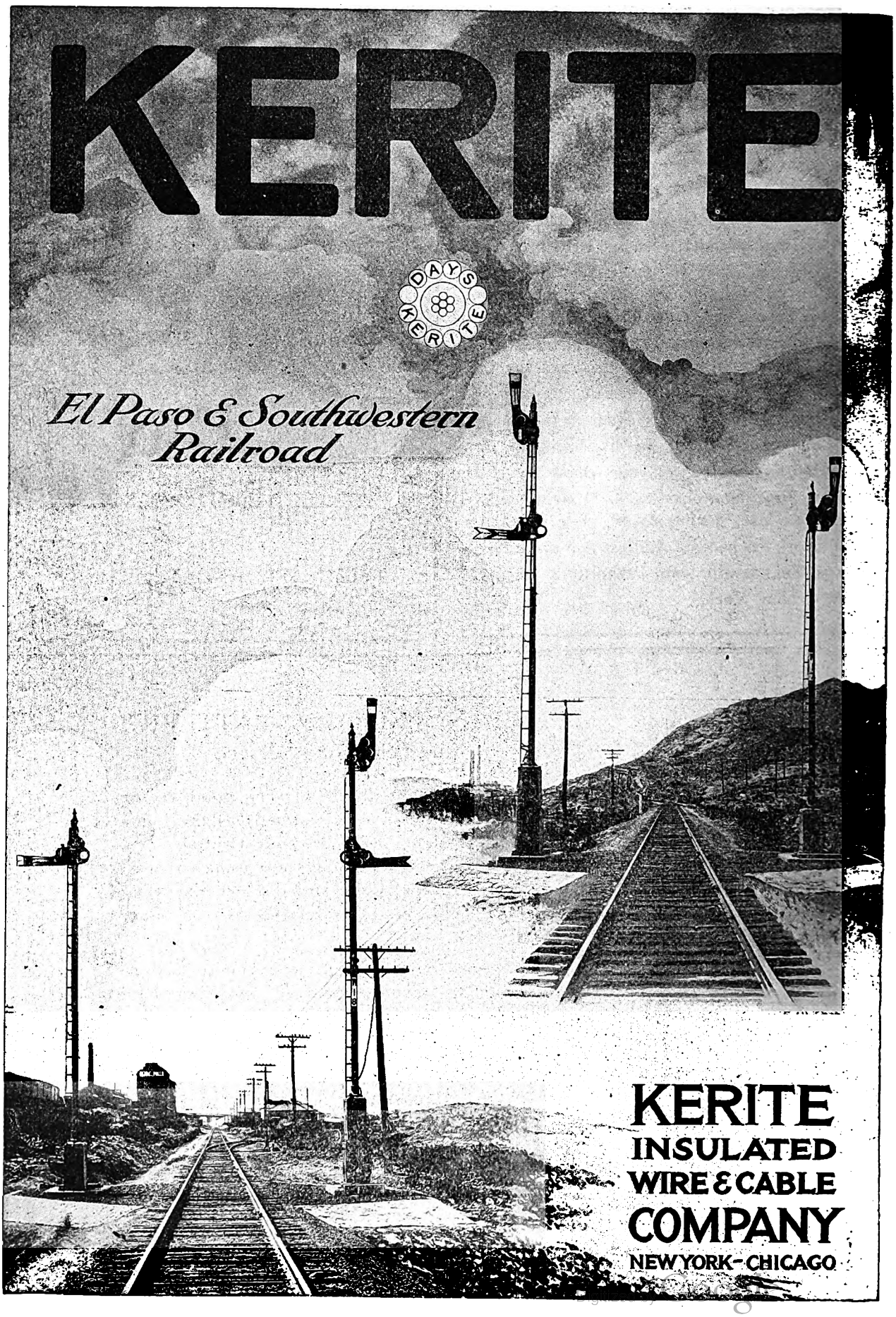
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General J. G. Harbord Pictures Future of Radio

TRANSMISSION of photographs over long distances, particularly between America and Europe, was outlined recently by General J. G. Harbord, President of the Radio Corporation of America, as one of the radio developments likely to become a reality in the near future. General Harbord spoke at the Third National Radio Exposition at the Grand Central Palace.

He did not limit transmission through the ether to photographs alone, but intimated that it would soon be possible to flash pictures of printed matter across the Atlantic at the speed of sunlight.

"Continuing with a thought for the future," he said, "let me invite your attention to the developments in radio photography. Some great strides have been made in this direction in the last year. It is not too much to say that we are on the eve of developments whereby it will be within the realm of possibility to transmit a complete newspaper page from London to New York by means of radio and in a fraction of the time it would take to transmit the entire text of the page either by radio or cable telegraph signals."

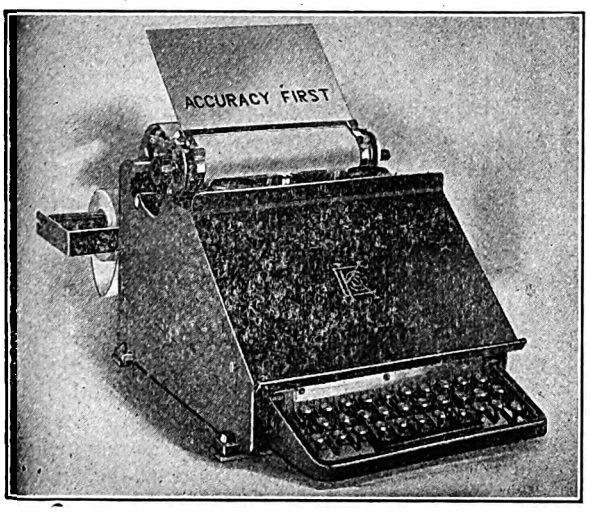
General Harbord then gave a summary of the developments which may be expected in the art of radio.

"Transoceanic broadcasting—in short, the realization of international broadcasting"—he said, "for purposes of entertainment is not yet in regular operation, but proposals for increasing the power of sending stations so that programs from London, Paris and Berlin may be easily heard in America are being carefully considered. When such a plan is put into practice the value of broadcasting will be greatly increased and one more link of friendship and understanding will be forged between the Old World and the New."

He pointed out that it will soon be possible to carry on two-way telephone conversation between a passenger on board a ship in midocean and any point on land where an ordinary telephone is available. "At present,' he went on, "transoceanic as well as marine radio messages are dispatched by means of telegraph code signals, but the transoceanic radio telephone, now under development, through the joint efforts of the American Telephone and Telegraph Company and the Radio Corporation of America, bids us to expect that before many years it will be possible and convenient for any one of us to pick up the telephone and in a short time be connected with his party in Europe or with his stateroom on some liner in midocean."

He asked his audience to consider how tremendous an accomplishment it is for an industry as young as radio and beset with so many complexities to have achieved so much in such a short period of time. He explained that it is one of the dreams of radio research men to give the public a universal radio ticker service; that is, the actual printing in words on paper of certain daily information at stated intervals, much in the same manner as the wire stock ticker and news work today, but on

EVERY USER IS A KLEINSCHMIDT BOOSTER



ONE CUSTOMER WRITES:

We are having little or no trouble with our machines. One man is taking care of twenty Telegraph Typewriters and he devotes part of his time to other matters.

ANOTHER WRITES:

We wish to advise you that your Telegraph Typewriters are working fine and doing everything you guaranteed them to do. We find the system one for efficiency and an asset to our working organization.

A THIRD WRITES:

Both machines gave excellent service and had hard usage as the test work is sometimes rougher than regular work on good lines.

KLEINSCHMIDT ELECTRIC CO., Inc.,

Nelson Avenue and Manley Street, Long Island City, New York

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a national scale rather than local. "The radio ticker,' he said, "will reach points not now accessible by other means."

He carried his predictions further by saying: "When one considers the progress that has already been made in the field of telemechanics, it requires no great stretch of the imagination to see the future airplane, the submarine, the ship at sea, in practical and direct control by radio from a point on land, if such remote control is desirable or necessary."

In closing, General Harbord said: "Radio sets now are bought ready made, just as one buys an automobile, a camera or a bicycle. One reason for this is the fact that radio is now universal in its appeal. Outwardly, at least, the modern radio receiver is no longer a complicated device requiring the experience of an expert to operate. It is, instead, an instrument with controls so simple that the veriest novice can operate it at first sight.

"And, what counts perhaps for most in this great development of radio, is that while these existing types of radio receivers that excite your admiration at this Radio Exposition were being evolved and perfected by their various manufacturers prices were steadily decreasing, until now a very few dollars enables one to choose from many efficient receivers on the market.

"I wish to emphasize to you the real mission of radio. We who are engaged in its development do not regard it as a medium or an agency designed to supplant existing methods of communication, or to do something which is now already being done quite effectively and economically by the land telegraph or the land telephone. On the contrary, we are developing radio in the direction of service to be rendered, messages to be carried, voices to be heard, in ways not now possible by existing means—in short, to make the lot of mankind easier and more ample."

OBITUARY

Littleton people were shocked on November 17th, to learn of the death of Mrs. Fred O. Nourse, local manager of the Western Union telegraph office. On November 15th, she was taken ill with pneumonia and gradually grew worse. Specialists were called in consultation, but nothing could be done to save her life.

Frances Amelia Nourse was born in Dobbs Ferry, N. Y., on March 31, 1860, the daughter of Daniel L. Martin. It was there that she spent her early life receiving her education in the schools of her native town. At the age of eighteen years she went to New York City and became a telegraph operator. It was in the metropolis that she met Mr. Nourse, also in the same business, and in 1887 they were united in marriage. To this union one daughter was born, Mrs. Ella Carter, now of Littleton.

Since the retirement of Mr. Nourse seven years ago, Mrs. Nourse had been manager of the Littleton telegraph office and had made hosts of friends by her obliging ways of meeting the public. She was a thoroughly good woman, one who saw the best side of her fellow citizens, one not quick to censure and was blessed with a charming disposition. For a number of years Mrs. Nourse was treasurer of the important organization within All Saints' Church and always transacted the business pertaining to her office in a loyal and upright manner. Littleton can ill afford to lose women of her type.

Besides her husband and daughter, Mrs. Nourse is survived by two sisters, Mrs. E. H. Falls of Westfield, N. J., and Miss Rachel Martin of Littleton. Funeral services were held at her late home, with burial in Glenwood cemetery.

Dr. John B. Boucher, aged sixty years, born in East Windsor, Conn., a prominent Hartford surgeon, died at his home in that city on November 5th. Dr. Boucher attended the common schools of East Windsor and the Enfield High School, and while working as a clerk for the New York, New Haven and Hartford Railroad he studied medicine and was graduated as a surgeon in Baltimore in 1894, since which time he had practiced his chosen profession at Hartford.

Louis Glass, aged seventy-nine years, formerly president of the Pacific States Telephone and Telegraph company, and afterwards organizer and president of the telephone system in the Philippine islands, died in San Francisco on November 12th.

He was a native of Maryland and went to California in 1868 as a telegraph operator. While identified with telephonic operations he originated the "express switchboard" and made the first installation on the Pacific coast of the harmonic party line system for selective party line service.

Justice of the Supreme Court John W. Goff, aged seventy-six years, a well known figure in New York City politics twenty-five years ago, and an old time telegrapher, died on the evening of November 9th at his home in New York City.

John W. Kane, aged thirty-four years, widely known as "Buckie" Kane, died recently at South Boston, after a month's illness.

Followers of athletic sports who crowded Newspaper row during the world series games and other events heard Kane describe the progress of play while the contest was being traced on the bulletin board of a local newspaper.

Mr. Kane started as messenger boy for the Western Union Telegraph Company at the age of fourteen years, became a telegrapher, and ticked off many of the great athletic events of several years past, being sent to cover baseball games, yacht races and other championship contests because of his wide knowledge of sport.

W. G. Good, formerly associated with the New York Telephone Company and more recently with the Standard Oil Company, New York, died suddenly on November 3rd at the Brooklyn Bridge Station, New York. He had been a member of the Telegraph and Telephone Life Insurance Association since 1882, and was also a member of the Gold and Stock Life Insurance Association.

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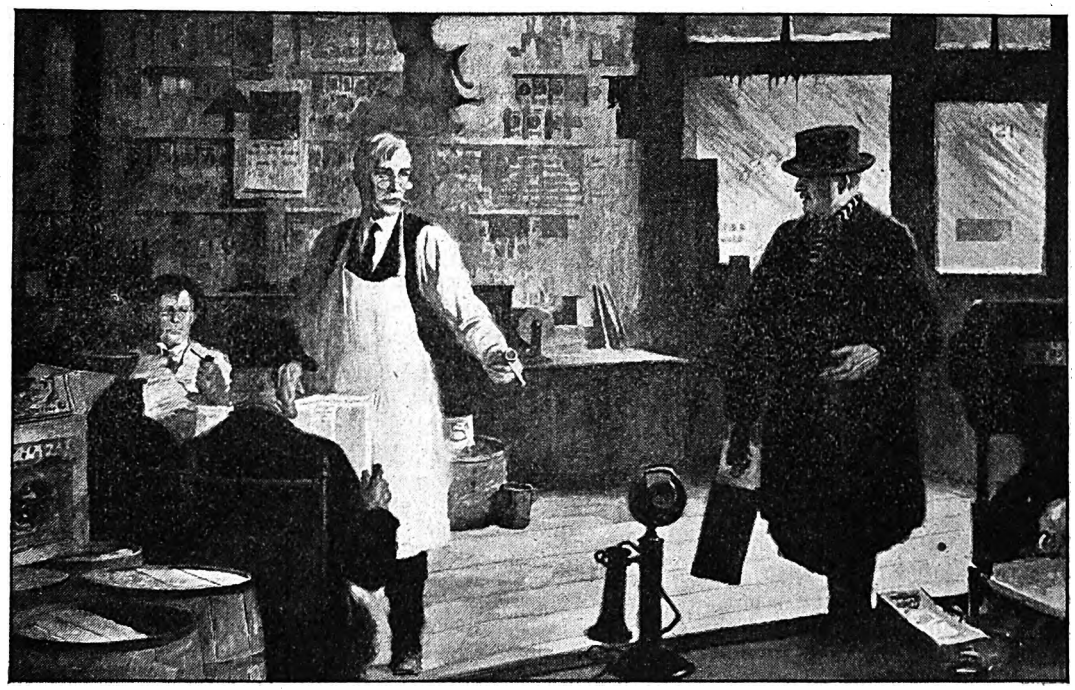

The People's Telephone

The telephone knows no favorites. It does the bidding of the country store and of the city bank. It is found in the ranch house kitchen and in the drawing-room of the city mansion. Its wires penetrate the northern forest, stretch across the prairie, are tunneled under city streets.

The telephone knows no favorites. Its service to all the people is of the same high standard—the Bell System standard. Twenty-four hours a day it carries the voices of all. For the benefit of all, the long-distance circuits are kept in tune. Numberless discoveries and improvements developed by the Bell System have made the telephone more useful for all the people. In America, all can afford the telephone, for Bell System service is the cheapest, as well as the best, in the world.

The telephone knows no favorites. It is not owned in any one locality or by any particular group of men. It is owned by 350,000 stockholders, who represent a cross-section of the thrift of the whole country. The owners of the telephone are those it serves.

In America to-day the 15,000,000 telephones of the Bell System contribute to the security, happiness and efficiency of all the people.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

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PERSONAL

COLONEL R. C. CLOWRY will leave shortly for Florida, where he expects to spend the coming winter.

POSTAL TELEGRAPH-CABLE COMPANY

CLARENCE H. MACKAY, President of the Postal Telegraph and Commercial Cable Companies, was one of the speakers at Radio Station WJY, New York City, on Tuesday evening, November 25th, in connection with the trans-Atlantic tests which were inaugurated under the auspices of "Radio Broadcast". Mr. Mackay gave a most interesting talk on the history of communications, developing the matter from the earliest stages and means employed by man in communicating with one another up to the present efficiency of communication by telegraph, telephone, cable and radio.

VICE-PRESIDENT, W. C. DAVIET was a guest at the regular meeting of the Kiwanis Club of Dover, N. J., on November 13th, at which time he made a short talk on the history of the development of telegraph and cable service, at the conclusion of which, two reels of "The Pulse of the World" film were shown illustrating the laying of the shore end of the new cable, and that of the making of repairs at sea.

Curtis A. Comstock, vice-president, is on a trip of inspection of offices at Buffalo, N. Y., and Cleveland, Ohio.

D. H. Gage, assistant engineer, recently spent several days in Baltimore, Md.

R. D. Jones, valuation engineer, recently made a trip to Washington, D. C., in connection with company matters.

Frank H. Dennis, Sr., for many years superintendent of the Commercial Cable Company's clearing house, New York City, died on November 15th, at Arlington, N. J. Interment was in the Arlington Cemetery, on November 25th.

A new office known as "JN" has been opened in the jewelry district at No. 18 John Street, New York City. M. H. Goldstein is manager, Mrs. E. C. Porter, operator, and J. Stein, clerk.

J. F. Geigle, for many years chief clerk at the cotton exchange office, New York City, died recently.

Death of Melville A. Baker

MELVILLE A. BAKER, aged 50 years, senior wire chief in the main office, Philadelphia, for the past twenty-five years, died on Tuesday, November 25th, after a brief illness.

The funeral was held from the funeral parlors of William H. Battersby, 3316 North Broad Street. Interment was at Ivan Hill Cemetery, Mt. Airy, Philadelphia, Pa., where also rest the remains of his wife, Mrs. M. A. Baker. The funeral was attended by a large number of his friends and coworkers. Among the officials attending were C. E. Bagley, Superintendent, J. H. Wilson, Manager, and E. W. Miller, chief operator.

The entire operating department mourn the loss of Mr. Baker, and extend their heartfelt sympathy to Mr. Baker's only surviving relative, E. Howard Baker, employed by the American Telephone and Telegraph Company, Philadelphia, as wire chief. Floral wreaths were sent by his numerous friends in Philadelphia and New York.

The Postal loses a valuable and loyal employee whom it will be hard to replace, and his friends will miss a kindly, genial and friendly spirit.

Fall Dinner of the Magnetic Club

THE fall dinner of the Magnetic Club took place at the Hotel Astor on Saturday evening, November 15th. There was an audience of four hundred and fifty. It was one of the best attended and highly successful meetings ever attained by this popular club.

Among those present, in addition to Class "A" banner winners throughout the system, and the Class "B" banner winners of the Eastern Division, were the following special guests: Superintendents Bagley, Hickey, Kimmey, Macken, McDermott, Reynolds, Richardson, Scrivens and Sheffrey of the Eastern Division, and K. F. Stiles, of the Southern Division; A. Balassa, chief clerk, general superintendent's office, Western Division, R. F. Hawkins, manager, Dallas, Texas; J. F. Heard, division electrical engineer, Atlanta, Ga.; Miss L. Y. Huot, Boston, Mass.; H. W. Pierce, chief clerk, general superintendent's office, Atlanta, Ga.; P. J. Riley, chief operator, Philadelphia, Pa., and Mrs. A. E. Watson, Paducah, Ky.

The list of those attending also included: Messrs. J. Allard, A. E. Alberts, C. Alvord, W. Anderson, A. Auslander, Mr. and Mrs. M. W. Blackmar, Misses M. Bannon, M. Barron, P. Bearsfield, C. D. Benz, and M. Bernholz; Messrs H. Baach, S. K. Babcock, P. Banks, N. G. Barringer, J. M. Barry, E. A. Berger, F. J. Block, D. J. Bonaui, H. T. Boyland, T. Brockington, F. Brown, W. P. Brown, H. C. Buchanan, C. G. Burden and J. J. Butt. Mr. and Mrs. C. A. Comstock, Mr. and Mrs. J. J. Cardona, Mrs. G. H. Cassen, Misses M. Caffey, F. Cook and R. Cook, Messrs. C. J. Caggeani, R. G. C. Carr, H. J. Casserly, H. T. Casey, T. Clarke, H. J. Coghlan, F. Cohen, M. Collins, E. A. Coney, J. D. Conners, A. F. Connery, D. V. Creary, J. Crocchiola, H. Cuddy, M. L. Cummiskey, J. B. Cunningham.

Mr. and Mrs. W. J. Deegan, Mr. and Mrs. W. C. Daviet, Miss D. Deegan, C. W. Daggett, J. J. Delehanty, M. DiDomenico, W. Dennin, H. B. Dobbs, M. Dodd, T. J. Donovan, D. Dougherty, T. F. Drew, S. Dubwsky, J. F. Duggan, A. A. Dunne, W. B. Dunn, J. A. Dupuis, J. J. Edmonds and W. G. Enrst, Misses L. Ferrante, Miss A. K. Flood, J. Fallon, J. L. Farrell, F. Ferrante, E. J. Finelli, W. Finley, V. F. Fiore, J. F. Fitzgerald, W. Fitzpatrick, C. P. Flood, G. A. Franks, A. S. Franz, H. G. Funk, D. H. Gage, C. A. Gall, F. Garabo, F. Garidiolla, P. J. Garvey, M. F. Geigle, S. H. Geller, S. B. Gensler, F. B. Gerrard, J. F. Gibbons, M. J. Gibbons, I. L. Goffio, A. Goldberg, J. Goldhammer, M. H. Goldstein, R. Gould, H. Graham, J. J. Griffin, A. C. Guiffrida, Miss G. Hopkins, F. Haight, R. J. Hall, L. Hanrahan, J. L. Harkins, O. Harris, J. B. Havice, J. F. Henry, H. J. Herbig, W. A. Hoffman, T. Holmes, M. Holmes, M. Homnick, T. J. Horan, J. Howell, E. J. Huber, P. A. Iger, A. C. Johnson, G. L. Jost, Miss R. D. Jones.

Miss E. M. Kernan, Miss M. Keegan, Miss A. Kopen, A. Kaufmann, A. F. Kavannaugh, J. Kavanaugh, Wm. J. Kavanaugh, W. L. Kearney, L. Kearsley, T. A. Keefe, C. R. Kennedy, F. J. Kernan, Wm. W. Kleinschmidt, A. A. Kramer, A. P. Kranshaar, J. F. Krinser, Miss R. Logan, W. Laker, J. Larkin, E. J. Leahy, J. Leary, T. J. Lenohan, C. P. Linder, F. Lissner, T. P. Lowery, J. V. Love, Miss E. McGrath, Miss A. McCarthy, Miss M. Moriarity, Mrs. C. McGrath, C. G. Mackey, A. B. Maggio, F. Maggio, J. J. Maguire, D. F. Mallen, J. Martini, F. Mason, C. H. Maurer, J. J. McArdle, W. J. McCarthy, M. A. McConnell, E. McCormick, C. J. McDonald, F. E. McKiernan, J. T. McLaughlin, C. P. McInerney, R. McInerny, H. McMains, E. McNally, A. W. McNeil, J. F. McNeill, W. J. McNickle, R. H. Miller, J. Miranda, G. Mitchell, W. J. Mitchell, A. Montouri, J. A. Mooney, H. Moritz, A. J. Motto, B. Munson, T. A. Murphy, J. H. Murray.

Mr. and Mrs. J. T. Needham, G. A. Nichols, E. Nielsen, A. S. Nigrelli, Miss L. O. O'Brien, Miss N. O'Donnell, Miss C. Ortiz, and Miss C. Oxley, G. J. O'Brien, J. C. O'Brien, G. R. O'Connor, J. J. O'Donnell, J. P. O'Donohue, G. W. Oram, J. O'Rourke, S. E. Ostrom, Mr. and Mrs. F. P. Phillips, Mrs. A. W. Porter, Miss E. A. Patterson, W. J. Pallas, A. B. Parrish, F. G. Payne, N. Pertka, F. W. Phelan, F. A. Pirie, F. Pisatelli, A. E. Powell, T. N. Powers, J. Quinlan, Mrs. M. Riols, Miss E. Riols, Miss C. Riordan, Miss S. L. Rogers, E. J. Rahtes, B. H. Reynolds, C. R. Rimpo and J. Russo.

Mr. and Mrs. J. F. Skirrow, Mr. and Mrs. C. J. Smith, Mrs. J. A. Shapiro, Miss A. Storace, G. A. Santulli, W. B. Schreiber, T. P. Searles, J. Setteducato, J. Shandley, P. R. Shingler, C

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Shirley, J. F. Shugrue, P. E. Solaski, N. J. Spinosa, W. Starace, G. B. Steenberg, L. Storace, H. Stout, S. J. Stultz, M. Sturner, D. Sullivan, D. J. Suriano, Mr. and Mrs. J. B. Taltavall, Mr. and Mrs. C. D. Thornburgh, Miss A. Tennart, Messrs. M. Tarangelo, J. W. Taser, A. C. Teller, J. H. Tierney, R. W. Trevt, J. J. Tobin, L. Tynan, R. J. Tyrrell Mr. and Mrs. E. M. Underhill, J. Ulla, W. S. Vail, G. Van Vaikenberg, G. Wallace, J. J. Wallace, R. E. Walsh, A. J. Ward, F. J. Wilbur, J. J. Williams, J. P. Williams, M. Williams, H. E. Wilson, J. H. Wilson, E. Witterholt, R. F. Wittgens, F. J. Woessner, W. M. Wolff, Charles Yacht, Miss C. Zelinsky, T. C. Zoeberlain and H. Zweifel.

S. F. Austin of the Commercial Cable Company, New York, as has been his custom for several years past, sailed for Havana, Cuba, from New York on November 2nd, where he will look after the racing business.

The First Permanent Broadcasting Station

IN YOUR issue of November 16th., there appeared two articles on the Origin of Broadcasting. In neither of these articles is any mention made of the fact that the first permanent Broadcasting Station was established in Canada.

This station, known as CFCF, was established in Montreal in January or February 1920, under the technical direction of J. O. G. Cann. The transmitter was rated at 500 Watts.

Receiving tests were made at Quebec (distant about 148 miles) and at Rimouski (distant about 320 miles) by A. Runciman; the Hon. Frank Carrel, proprietor of the Quebec Telegraph Company, being a witness at the former place.

From this time, as far as my memory serves me, programmes were broadcast regularly on Tuesday evenings; and then on Tuesdays and Thursdays, and soon on every week-night. The first Station Manager, or "Announcer", was D. R. P. Coates, now acting in a similar capacity for the Manitoba Government.

No doubt, all these facts can be confirmed by the records of the Canadian Marconi Company, and the older radio amateurs of Montreal. It is fitting that they should be placed on record, for while Canada lays claim to no great invention in connection with radio, she can claim to have been the pioneer in many of its most useful applications. Whether it is the application of radio to moving trains, inter-city and trans-oceanic telegraphy, coordinated and free direction-finding service, or broadcasting; the daddy of them all will be found in Canada. Even now, one terminal of the first trans-ocean beam radio service, is in progress of construction near Montreal.

Station CFCF (Montreal), was checking amateur wave-lengths, months before KDKA (Pittsburgh) was opened.

Yours sincerely,
A. H. Morse, 422 Prince Albert Ave,
Westmount, Montreal, P. Q.
Canada.

ANY of our readers who are in the market for a new radio set should refer to the advertisement of J. H. Bunnell & Co. in this issue. This company is putting out a new super-heterodyne set the excellence of which is assured by the fact that it is made by Bunnell. Indeed, anything sold by this house, may be depended upon to be as good as the best.

"If you get it at Bunnell's it's Right."

THE WESTERN UNION TELEGRAPH CO.

BROWN, WHEELOCK: HARRIS, VOUGHT & Co. sold for Thomas-Worth Realty Corporation to the Western Union Telegraph Company, Newcomb Carlton, president, the seven-story building at 85 to 89 Thomas Street and the five-story building at 20 and 22 Worth Street, covering an area of over 11,000 square feet.

These buildings, now occupied by Claflins, Inc., abut the R. C. Williams Company property, covering the entire easterly side of Hudson Street, between Thomas and Worth Streets, recently sold by the same brokerage firm to the Western Union Telegraph Company, and gives it an area of sixteen lots, or approximately 40,000 square feet, one of the largest holdings in the downtown section in one ownership. The telegraph company was represented by Francis R. Stark and R. H. Overbaugh, and the sellers by Patterson, Eagle, Greenough & Day.

A. H. Howard, assistant electrician, Bay Roberts, Nfld., won the five hundred dollar prize in making the best suggestion in the improvement in cable rotary repeaters.

There were one hundred and forty cash prizes awarded, in addition to the $500.00 prize won by Mr. Howard, for meritorious suggestions "how to improve the Western Union service." The awards were signed by Lewis McKisick, assistant to the president, New York, chairman of the Central Competition Committee.

H. G. HEININGER, division traffic superintendent, Southern Division, was a caller at the executive offices last week.

R. F. PITTMAN, aged forty-six years, died at Atlanta, Ga., on November 7th. He was born at Quincy, Fla. Mr. Pittman was connected with the Southern Railway Company before taking his position with the Western Union Telegraph Company.

Western Union Head Says Radio Cannot Ever Replace Wires

BY DREW PEARSON

"THE telegraph companies of this country are not going to kiss their poles and wires goodby."

Newcomb Carlton gave me that emphatic answer when I asked him if radio would not eventually force the communication companies to abandon telegraph wires and cables.

Newcomb Carlton gave me that.

Newcomb is about as well qualified to answer that question as any one, for besides heading the Western Union, he is chief executive of the American Telegraph and Cable Company, and of the International Ocean, Gold and Stock Telegraph Company, and serves as a director of more express companies and railroads than he can remember.

I asked him if radio would ever supplant the wires in carrying the messages of the world.

"The day may come," he replied quizzically, "when you take your lady-love out for a drive, providing, of course, there's room on the road, and the air will be stiff with messages. But I say

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never—and never is a long time—will the conditions of the atmosphere be such as to make the air absolutely reliable as a means of transmission.

"Radio suffers from two handicaps. First and most important it must operate in the air, and while methods of transmission have made tremendous progress in overcoming static, yet the sixteen years of wireless and radio development have seen nothing to make us feel that the wires can be abandoned.

"A communication concern must guarantee reliability and regularity. Its patrons demand that their messages get there, electric storms or no electric storms. For this the air is too uncertain. Even our transatlantic cables, buried six miles beneath the sea and insulated with every kind of resistant material known to man, are sometimes grounded by the aurora borealis.

"The second great handicap," Mr. Carlton continued, "is what I call the disease of distance. It's hard enough, the Lord knows, to operate between two terminals both belonging to the same company, but when one company in one country is sending, and another company in a different country is receiving, you buck up against a political handicap that is unbelievably difficult. Imagine broadcasting a message to Soviet Russia.

"After all, I'm running a communications concern. I don't care how the messages are transmitted so long as they are efficiently transmitted. If wires are best, why, we'll use wires. If it's air, we'll use air.

"But you can bet your bottom dollar on one thing, the telegraph companies of this country are not going to kiss their poles and wires goodby."

"Are not radio and wireless handicapped by their lack of privacy?" I asked.

"Not so you would notice it," was Mr. Carlton's prompt reply. "Probably future inventions will insure privacy. However, that is a very small matter. Private messages are in code anyway. Most messages concern only one person and are of interest to no one else. The supremacy of the telegraph and cables can rest on no such nebulous thing as privacy. What is privacy, anyway? I don't believe there is such a thing in these days of prohibition and investigations."

"What are the telegraph and cable companies doing to meet the competition of wireless and radio?" I asked.

"There isn't much competition. They serve as allies, instead of taking business away from each other. Let me explain why."

Mr. Carlton picked up a pencil and drew a rough sketch of the Atlantic ocean and the countries of Europe and America bordering it.

"Now, here's our New York-London cable," he said, drawing a line across his map, "and when we send a message to any point in England it is relayed from London to its destination in quick and efficient manner by British government telegraph. That's all O. K., because the British government gives the cable companies excellent cooperation. But suppose we want to send a message inland to Czecho-Slovakia, then the message has to be relayed through half a dozen countries, speaking different languages.

"Since the governments operate the telegraph systems of Europe, there is considerable delay. In that case it is much easier to relay the message by radio.

"Now do you get my point? Wireless acts as a feeder to the cables. To points where there is little business, such as Russia, where the overhead cost of a direct cable is prohibitive, the wireless relays the message. Radio supplements cables, and vice versa.

"The cable companies will always monopolize communications between great world ports such as New York, London, Antwerp and Amsterdam.

"Do you see that boat over there?" Mr. Carlton pointed to a showcase in one end of his office which held a miniature vessel. "That ship saw the most important event in the history of international communications sixty-six years ago when Cyrus Field laid the first Atlantic cable from its stern. The other day, the cable ship Colonia laid the next most important cable, from New York to the Azores. I say next most important because this cable increases the rate of sending from five to eight times.

"Here's a chunk of it," he continued, picking up a piece of heavily insulated copper which looked more like a paper-weight than a piece of transatlantic cable. "Do you see this little ribbon of metal? That's called permalloy and is about 80 per cent nickel and 20 per cent iron. We've found by experiment that it is the most highly magnetic substance yet discovered. It is only 6-1000 inch thick, but it runs for 10,000 miles, and is the sole reason why we can now send 1500 letters per minute where we used to send 250.

"Previously signals had to be sent very slowly to keep the 'head' of the wave from overtaking the 'tail' of the preceding impulse, which overlapped and blurred the message. This little strip of permalloy remedies all that and allows messages to be sent so fast that we have had to install six new automatic printing machines to record the messages received. Cable communication has become so highly developed and perfected that the radio cannot yet compete with it in reliability."

DYNAMO ELECTRIC MACHINERY by Erich Hausmann, E. E., Sc. D., just off the press, has been placed on the market by D. Van Nostrand Company. This is a book measuring 5½ inches wide by 8¾ inches in length and contains 646 pages and 447 illustrations. The book is intended for electrical workers who are earnestly studying the subject by themselves and who have previously acquired some proficiency in mathematics.

The price of the book is $4.50 per copy and may be obtained of Telegraph and Telephone Age, 253 Broadway, New York.

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Messenger Boys Have Many Duties

WHETHER IT IS DELIVERING TELEGRAM IN SUBURB ON WINTRY NIGHT OR FEEDING CAT IN MAPLE STREET HE DOES WORK FAITHFULLY

IT was a miserable winter night. The falling snow had turned to a mixture of rain and sleet and the ground was covered knee-deep with sticky slush. Trains, electric cars and automobiles were stalled and helpless. Transportation was paralyzed.

Shortly before midnight a telegram for a North Wilbraham man came into the office of the Western Union Telegraph Company. A boy was called and instructed to deliver the message. He accepted the telegram without question and fared forth into the night. One glance at the slushy streets convinced him that it was futile to depend on the ordinary modes of transportation.

He hesitated but a moment. Acting purely on his own initiative, he resolutely set out on foot for the opposite side of the city to borrow an old horse of his grandfather's. He aroused his relative and obtained the nag. Mounting the beast, he headed for North Wilbraham, paying little heed to the stinging sleet. When he finally arrived he was covered with ice, but the message was delivered.

That boy is now a young man and he occupies a responsible position with a Springfield concern. A lad of his type cannot be kept down, and many feel that he is characteristic of the personnel of the telegraph messengers. The Western Union office is constantly being called upon to recommend good boys to industrial and commercial concerns, and for the boy the service is obviously an excellent training school whose worthy graduates are afforded innumerable opportunities for betterment.

Not all of the telegraph messenger's assignments are arduous, however, and many of his duties are amusing and entertaining. There is probably no other profession in existence where a boy encounters such a wide variety of tasks as in the telegraph service.

One messenger boy enjoyed the novelty of being assigned to a cat feeding labor during the past summer. A Maple Street family went away for the annual vacation and when ready to leave found that no provision had been made for taking care of the cat. Quite naturally, the Western Union was called and a boy appeared, who was instructed to give the cat a saucer of milk every morning. Aside from the feeding the feline individual was quite able to care for itself throughout the day and night.

Another task that often falls to the lot of the messenger is watching babies. Sometimes they take care of infants while mothers are out shopping and on other occasions they wheel them through the park for an airing. While the job of pushing baby buggies is not exactly relished by the boys, they always do their best and they are oftentimes rewarded by generous tips.

Guiding blind men is another duty at which the messenger boy is often occupied and it is noticeable that these afflicted individuals seem to feel a comforting sense of security while in charge of these youthful but capable custodians. There is little profit in this type of work as the company has special rates for leading the blind, which are so little as to be practically philanthropic.

Making money deposits and carrying important documents to the State House at Boston are tasks often performed by the messenger. They are also frequently called upon to watch offices in the absence of business men who have no regular office force, the boys taking telephone calls and looking after things generally. Occasionally they are sent away for machine parts, especially automotive, while it is a regular thing to carry tires or other motor accessories to stranded automobilists on the outskirts. In the days before regular automotive transportation of moving picture films, the boys were often engaged to go to Boston after these necessities.

Once in a great while, a Springfield messenger boy is employed as private detective to shadow a certain party and there have been instances when a boy traveled as far afield as Syracuse while engaged in work of this nature. Reports are made regularly and due to the fact that the sight of a Western Union messenger arouses little suspicion, the boys are able to perform very efficient service.

One of the easier jobs of the boys is conducting sightseeingtours. Frequently tourists visiting Springfield engage a messenger to show them around the city and point out those points of interest which would be missed without the services of a guide familiar with local surroundings.

A valuable and convenient service performed by Springfield messenger boys is in the role of interpreters. Greek, Italian, French, Jewish and Swedish lads are at present employed by the company and they make themselves of great worth when business is conducted with foreigners of these nationalities, who are unable to speak English.

Not the least of the messenger's duties is his work with reporters and newspaper photographers. Their professions are more or less similar in that neither has any conception of what the day will bring forth in the line of activities when he reports for work in the morning. Occasionally on rush stories and pictures, the boy is employed to relay material and plates to the office when the newspaperman is forced to remain on the job.

There are numerous odd jobs, such as tending furnaces, walking dogs, rescuing treed cats, delivering live stock, climbing in windows to admit locked out women, and other tasks of like nature that fall to the lot of the messenger, but they are no more disturbing to his equanimity than the delivery of an ordinary telegram.

The Springfield force consists of 30 messengers, four with motorcycles and the rest with bicycles. The personnel is constantly shifting, due to the fact that the boys with marked ability soon find better positions opened to them. Their uniforms are rented to them by the company and the bicycles furnished at special rates. They are encouraged to partake in athletics and are thoroughly coached in first aid and safety work.

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In the larger cities they are organized into military units and bands. Monthly inspirational meetings are held under the direction of Manager M. J. Carey at which an effort is made to help the boy in every possible way. The weekly pay of the messengers with salary, bonus and gratuities, ranges from $12 up to $40 or $50.

Mr. Carey stresses the fact that the present type of messenger boy is of higher caliber than was common some years ago and that the prejudice of parents against boys going into the Western Union service, which was formerly so general, has practically disappeared. The managements of the various branches of the service insist upon a good type of boy and it is their intention to keep the personnel on a high plane. At the present time, the majority of the boys are obtained through the Continuation School with the authorities of which the Western Union managers work in close cooperation.

School for Lineman's Training

O. P. SAMMONS, Okmulgee, Okla., an old time and well known lineman, contemplates starting a school for the training of good husky young men, for linemen, inside wiremen, telephone, repairing, telegraph line repairing and construction, trouble shooting and such. Mr. Sammons will put through a course of practical training such as digging poles, stringing wire, wiring offices and switchboards, both telephone and telegraph, electric light wiring, installation of motors and equipment, and the care of such, and the connecting of transformers, the sizes of wire, and how to handle material and care for it. Mr. Sammons has had forty years of practical experience and it seems to him that he ought to be able to drill such men so that they will be able to take a job within three months. It is the intention of Mr. Sammons to endeavor to induce the various companies to use these men after they have become proficient. It seems to us that a man of Mr. Sammon's experience in line construction work ought to fit him to turn out just the kind of men the companies desire, and we wish Mr. Sammons every success in his undertaking.

THE Roller-Smith Company, New York, announces the appointment of Charles R. Speaker, Evening Star Building, Washington, D. C., as its representative in the District of Columbia. Mr. Speaker will also handle the Roller-Smith Company's Government business in the States of Maryland, Virginia, North Carolina and South Carolina.

GODFREY ISAACS, managing director of the Marconi's Wireless Telegraph Company, Ltd., London, England, has resigned under doctor's orders. His place has been filled by the election of Frank G. Kellaway, a former postmaster general of England.

Robert Vincent Woods

Robert Vincent Woods, aged thirty-two years an operator for the Independent Wireless Company, died on November 12th, at his home, 1365 South Second Street, Plainfield, N. J. He was born in England. During the World War he served as an operator on transports and was aboard the New York when she was torpedoed off Ireland. He is survived by his parents, four brothers and two sisters.

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. 24 NEW YORK, DECEMBER 16, 1924 Forty-second year

CONTENTS

PAGE

Fifty Miles from Nowhere. By W. Lee Dickson. (Concluded from page 536, December 1st issue) 558

Communication from Its Earliest Inception to Date. By Clarence H. Mackay 562

West India and Panama Telegraph Company 564

Editorial Comment—Christmas Greetings. Were Afraid to Use Pioneer Telephones. Annual Entertainment and Reception of the New York Telegraphers' Aid Society. Marconi Wireless Telegraph Company Stock. 20,000 New Telephones for Detroit Each Year 565

Graphical Pole Line Calculations. By J. L. Niesse 566

Aviators Versus Operators. Wireless Education 570

Railroad-Telegraph and Telephone Section of the American Railway Association 573

Telegraph and Telephone Life Insurance Association 577

Postal Telegraph-Cable Company. Telephone at Grand Canyon. Western Union Telegraph Company. Borough Business is Healthy. By Chas. B. McCann 578

Radio Corporation of America. Obituary 579

Major Cecil W. Mackenzie 580

Delicate Adjustment in Long Distance Circuits Make Possible Simultaneous Radio Broadcasting. By John B. O'Brien 581

Test All Long Distance Lines Every Morning. Facts About the Telephone. What "Station" Means in Telephone Parlance 582

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Fifty Miles From Nowhere

By W. Lee Dickson.

(Concluded from page 536, December 1, Issue)

Three days of repairing cable, and their nights of the childish game, passed slowly, hopelessly. Tunby showed a keen desire to keep Jerry aboard indefinitely. Jerry, hoping against hope for a different means, still hesitated to write his resignation. The captain would be displeased and could make it very bad for him—for months perhaps. And Jerry liked the grizzled old Tunby. It would hurt, telling him at all.

It was toward the fourth evening—a Sunday—that the sea grew choppy and ominous clouds came low from the horizon, preceded by an evil wind. The captain altered his course to encircle the storm. He glared at the oncoming clouds and echoed their thunder, cursing the coast and storms impartially. But the twelve-knot ship was not to escape. The storm broke full upon her, seeming to concentrate its furies on her long-delayed destruction. There was mad haste in battening and securing. Sweat coursed with rain down the men's faces. There is a saying that, until one has known starvation, love and Paris, one has not lived. To these requisites should be added a storm at sea in a ship like the Marius. . . . Jerry stood watching, suddenly respectful of the sea and its men.

"Put back for Ballinskellig's!" Tunby bawled through the din. He then screamed in Jerry's ear that seeking the shelter of Ballinskellig's, at night, through its rocks and bars, was almost as hazardous as trying to ride out the storm. "But I can't make Dingle Bay; the wind'd drive me on Bray Head! She's old, is this girl; she can't stand many hours of this! We'll be takin' water like a sponge!"

Twelve times Jerry thought he was shipwrecked; and each time the Marius, like a suffering animal, came up and lunged blindly into the next punishing wave. Darkness came quickly; and the night was a bedlam of storm noises.

Fearful, and praying to strange gods, the captain took the wheel at the entrance to the bay. With just enough way for her helm, he miraculously took the Marius to comparatively calm water. "Full speed astern!" he howled; then, "Let go!" and the anchor splashed over the bow. The men gave mute but fervent thanks, and grinned at each other as men do who have miraculously escaped terrible things. Tunby pointed shoreward, to lights, dim and hazy through the rain. "There's your damn station," he told Jerry, and went below for his food.

There, indeed it was—if one strained hard enough through the wet black. There somewhere were Disbrow, and Napoleon, and Jo. Fate had brought him near her again. He wondered—though it wasn't likely—if she might be peering at the lights of the ship, and thinking of him. The crew had gone below to eat. Their happy blasphemies came upward to him, mixed with the lively clatter of dishes. He stood by the rail, alone on the splattering deck, loath to leave sight of those dim lights ashore, near one of which Jo must be. "When?" he asked himself. "When—and how?" Thus he stood in the cold downpour, lost in more profitless wondering, chafing anew at his helplessness.

He was startled by a reddish flash near one o the buildings, followed, as the sound reached hi by a sharp report. Soon half a dozen spurts o flame darted from shore followed by the unmistak able crackling of rifles. He ran aft to the captai who was stuffing himself prodigiously. "Sir!" h exclaimed. "There's firing ashore—at the station!

But the captain was far from the station; an more important, he was eating. He waved on paw in a deprecating gesture, saying through muc food: "Tush! Sit down to this meat, boy."

"Don't you want to see?" Jerry urged. It's rifle I'm sure. There may be trouble—"

Tunby swallowed, which was quite somethin "Trouble—hell! What do you think *I've* had the past four hours—a tea party on the Royal yacht Trouble! There's trouble everywhere these day You don't have to squint for it through a storm Now, sit down and—" But Jerry had fled back t the bow.

He heard more shots, not always seeing the flashes. He thought he heard hoarse cries tha came over the interval of black water. Then pinkish glow quavered wickedly, and increased wit awesome speed. It was fire; a building of the sta tion. He remembered now! The rumors of th insurgents! He ran, stumbling and sliding, back t the captain.

"A building's on fire, sir! Come look!"

Tunby cursed roundly, but followed Jerry ou into the rain. "Well, I'll be damned! It *does* loo like a fire!"

"It *is* a fire, sir!"

"Ye-es, it surely is. Well, well!"—with inflam ing calmness.

"Aren't we going in, sir? Won't you send in th boats?"

Tunby stared through the rain at Jerry with mor wonder than the blaze had provoked. "Go ashore! Through this water?"

"But they may need us!" Jerry exclaimed.

"Are you crazy, Martin? You can't get a boa through that water—not once in a hundred. Any how"—here he turned toward his cabin—"I'm a sailor, not a fireman."

Jerry halted him with: "Captain! Do you sup pose it's the Republicans taking the station?" But if he had expected this to excite Tunby he was disappointed.

"Like as not," the skipper replied, gazing shore ward again. "I've heard talk of it for weeks. But it's not your fight, nor mine, Martin. That's one good thing about being afloat—even in the Marius! And," he added, with a nudge, "no matter who loses, the Irish must win!"

He turned again to his cabin. It was Jerry's tone that stopped him. "Captain, will you give me a boat? I want to go in."

"You want to go in? In the name of Ann's donkey, what for?"

It was something to do with Jo. It was entirely to do with Jo. Weakly, he said, "Be-cause."

"Well, that's as good a reason as any on a night like this. But no boat leaves this ship until morn

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ing, if then. Now, come on and eat, Martin!"

Tunby was gone. The fire had mounted higher, throwing a blood-tinted path across the water to the ship. He could distinguish other buildings now—a lurid scene from this distance. The other lights had gone out; and the firing had ceased. But he could stand this no longer. His excited brain imagined that Jo called him. He would try once again. Rushing to Tunby's cabin, he cried: "Sir, will you *please* lower a boat?"

"No Damn it, no!" Tunby roared.

There was no choice then. Casting off his shoes and coat, he climbed over the rail, stood poised a moment in fear, then plunged to the murk below. The shock was terrific. The black was like nothing he had ever known. A cold, terrifying, Cimmerian hour, it seemed. Gaining the surface at last, he was guided shoreward by the ominous beacon. The storm was withdrawing to sea, but the bay was choppy, unfriendly; and the rain was an added discomfort, pelting his eyes and obscuring everything. He struggled on.

Looking back at the deeper shadow of the ship, he was dismayed to see how small had been his progress. Then, with awful surprise, his face and body crashed against a rock. He pushed away, with a cry. He realized now why Tunby was afraid; and knew himself in a world of hostile elements. If his strength should fail. . . . He stroked on—and on. . . . Then fresh dismay struck deep as his leg began to pain with every stroke. The pain rapidly increased to agony; and he was forced on his back, to rest. Thus weary, he glimpsed the furtive moon, now released by retreating clouds. It all seemed so terribly unreal. . . . He turned, and started anew for the shore.

Jerry awoke from a sleep as deep as death—and not far from it. Opening his eyes, he stared into the bearded face of Captain Tunby, bending over him anxiously. One of Tunby's great paws rested on his forehead. "There now!" said the captain, with astounding gentleness. Don't talk; you're all right now."

Puzzling! What was this? It wasn't the ship. He asked the obvious question.

"It's Mr. Jessup's house," the captain told him. "There now!"

He then discovered an aged, kindly man, bald and grotesquely wrinkled, who stood smiling at the foot of his bed. Jerry's eyes asked questions, and the old man spoke.

"I'm Dr. Duffy, from Cahirciveen," he told Jerry. His brogue was rich and musical. "Just lie quiet, me lad, as the good captain tells ye. We'll have ye in fightin' trim in a day or two." He then turned to Tunby and motioned him to the door. There he whispered instructions and withdrew.

Jerry grouped through this mystery of a new and inexplicable existence. Gradually the curtain of fog lifted, revealing the ship, then the fire, his plunge, the cloud and the moon.

He turned toward Tunby. "I—I made an ass of myself, didn't I?" he said, smiling weakly.

"You mighty near made a funeral of yourself. When I discovered you'd jumped for it, I put over a boat—with some cursing at the time, I'll tell you—and we found you, by the grace o' God, just before you—er—well, if it hadn't been for a moon—But say! You didn't tell me the *real* reason you wanted to come ashore." This with a gruff chuckle. "She said she knew you'd do it. Ain't that Ann's donkey for you? She said she knew you'd do it!"

"You mean Jo. Where is Jo? Is she all right?"

"All right enough to have you brought here to her house, and work over you like the rest of us all night—only a bit harder. Doc Duffy says he don't know what he'd done without her. He called her unhysterical, which he said we wasn't."

"But what happened? The station, I mean?"

"Oh, it's all in the hands of the Republican lads. They fired a few shots, it seems, and the old quarters caught fire, somehow; but now that they've got the place and stopped the cables, they're as peaceable as any Irishmen I ever saw—exceptin' a few of the sentries. They promise more shootin' if anybody tries to leave. They're afraid somebody'll get the Free Staters. They'll come along in a day or so, anyhow; then we'll have some excitement. But last night, well, there really wasn't no cause for anybody actin' up like—like—never mind. Want some food? No? Can't understand that. Well, try some more sleep, son."

Jerry closed his eyes to welcome dark again. His leg was bound. It reminded him of the hospital. He slept. Tunby—this is hard to imagine—tiptoed from the room.

He awakened again to something tenderly familiar. Gentle fingers were stroking his hair. It was very like the hospital; and he opened his eyes. Jo! Jo, smiling and nearly beautiful, and all in the white of nursing. Jerry, being man, never knew with what infinite thrill she had taken forth this uniform, refreshed it, and donned it, tingling and hoping that he'd notice. He did. Through his first embarrassment, he said: "You're a nurse again, aren't you?" And she was very happy.

She pressed cool lips to his forehead. "We're going away from here, Jerry boy, she said.

"Yes," he repeated, "we're going away, together."

They gazed at each other, long and in silence.

Youth is served with strength, which returned to Jerry quickly. With it one morning came Mr. Jessup, stern as usual, but not unkindly. He sat by Jerry's bed and succinctly made clear the object of his coming. "My daughter," he said, without prologue, "loves you. She has told me so. Are you in love with her?"

Jerry looked in his inquisitor's gray eyes. "I am, sir."

"As I thought. Now, Martin, I want to tell you a brief story. There was once a very beautiful girl who fell in love with a cable man, not unlike yourself. She gave up her friends and abandoned the best things in life to follow him. She stood by him for years, in just such desolation as this. The hardship and loneliness aged her terribly. She faded long before her time. She loved beauty, life,

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happiness, but had none of them. Her husband, ambitious, intent on rising, never noticed these things until it was too late. She died, Martin. Yes, she died of mental and spiritual starvation. That girl was Jo's mother, my wife."

The simple narration of this tragedy made it more frightful. After a trying pause, Jerry said: "But, Mr. Jessup, you would have kept Jo here, I understand—"

"Had I continued in my selfishness—yes. I'd hoped she might settle down here, in a way, but I've been brought to realize she's like her mother. I want her to go to my sister, in London. You can see why." He rose stiffly. "Martin, matters of discipline that have come between us are wiped out. You meant to do a fine thing last night, if you were needed, and I thank you. You see, I can't help you here sufficiently to matter. But when we get the station back, I *can* arrange a discharge, at once. If you love Jo, you'll see the truth in what I've tried to tell you. You can't put a rose in sand and gloom and—and expect it to live, Martin Think it over."

The simile was homely but effective. But Jerry had thought it over—at length and dispassionately. He knew every argument against him. The alternative of taking Jo out into the world, to inevitable hardship and privation, was no better. He pictured her in tawdry clothes, tired, cooking for him in a miserable flat, near anywhere he might get a job. Suppose he didn't get a job. Mr. Jessup was right. Disbrow was right. And so, when Jo came to him that evening and said again, "We're going away soon, aren't we, Jerry?" he lied bravely, "You bet we are!" But he had other plans, sadly sound and unromantic.

The following evening he sent for Disbrow and Napoleon, to abet those plans. They told him of the station and its men in this strange inactivity, and talked in excited whispers of a fight on the impending arrival of the Free State troops. Then he surprised them with a sudden announcement. "Boys," he said abruptly, "you've got to help me. Will you?"

Napoleon answered for them both.

"Would we 'elp our own mother?"

"Good! This is it: I'm getting out of here tomorrow. I'm running for it, see?"

"But—" they began.

"Please don't ask questions! I'm running, that's all. It's not deserting; my discharge will be taken care of before I reach London. But I need my clothes; and my money's in them. Old Tunby'll give them to you. And don't forget my banjo! Sneak 'em up here without *anybody* knowing. Will you do that?"

"But the sentries?" Disbrow worried. "They won't allow you to leave."

"Cawn't ya wyte till we're peaceable-like an' calm again?" Napoleon begged.

"I can't wait at all! Now, I've asked you a favor. Will you?"

His two friends, oddly drawn together by a common idol, looked at each other. They had no choice. They looked back at Jerry and nodded.

"Good!" he said. "Remember: don't let anyone know, and *don't forget my banjo!*"

They stayed late into the night, loath to believe that he was passing from their lives.

It was the only way, he reasoned.

The next afternoon, Napoleon sneaked into his room with his belongings, stowed them under his bed, whispered, "Tunby says best o' luck, lad!" and departed.

Jo read to him—happy and unsuspecting. He heard nothing that she read, but let his eyes rest upon her face—her mouth that once he had kissed. He saw the star—that night on the ledge—cold and silver over the hulk of the Marius. It was not his star, after all. But it wasn't Hornby's, anyhow. He felt proud in a warning sense that he was doing something for Jo. He'd just go. It *was* the only way. She'd meet some fine fellow in London. . . . Or, maybe, if things went right with him, some day. . . .

He had determined to leave when she was at dinner, and when she rose to go, he said: "Jo, look at me. You—you said you believed in me. You do, don't you?"

His changed expression, his new tone, puzzled her. "Why, of course! But is anything wrong, Jerry?"

He dissembled. "No; only—will you always believe I'm—I'm all right, Jo?"

"Of course I will, silly boy! But what is it, Jerry?"

"I—I just wanted to hear you say it, I guess." Then, almost brusquely: "Go to your dinner, Jo."

"My own boy!" she said. "It's getting on your nerves." She kissed his cheek, patted him chidingly, and left the room.

He bit his lip and stifled back a great weakness. He wanted to cry out to her, to have her back, and give up the whole sickening plan. But he conquered, and donned his clothes.

Battered bag and banjo held tight, he sought the rear and unused stairs. Down these he tiptoed, careful of every step. Around a dark corner he found a door—unlocked. He opened it and emerged into the shadow of the house. Here, for the first time, he considered the sentries. He had taken the whole thing for granted; but they were yet to be passed. Intently, he peered along the walk that skirted the buildings, on the side away from the bay. Beyond, over the sports field and a stretch of gorse, lay the Cahirciveen road, and escape.

A tall man was pacing the walk, rifle on shoulder. His post was a long one, taking him past the office, a full hundred and fifty yards from the Jessup house. Jerry watched him draw near. Concealed in the shadow, he could have touched the man as he turned to doube back again. Jerry waited. The footsteps grew dim, and the sentry melted into the shadow, the lights of windows marking his progress as he passed them. When he was near the office, Jerry bolted, bending as low as his burden per-

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nitted. He gained the sports field, crossed it, and ntered the scrub-growth, headed for the highway. He was half amazed, half amused, at the ease of ccomplishing this.

Stumbling through the gorse, counting his escape fact, he was frozen by a piercing voice, directly head: 'Halt there!" Instinctively, and with too nuch noise, he dropped to the ground. The voice alled again: "Halt or I'll shoot!" This puzzled im. He placed his bag between him and the unseen sentry; and while he pondered the second challenge, a shot rang just ahead, followed by the ound of a bicycle falling noisily. Then a choking ry.

For the first time, Jerry realized the challenge had not been for him. Groaning followed the cry, and he knew that some one was hit badly. But Jerry had been at war. He lay still, and decided to make his escape in the excitement—for people were already calling and running from the station. Then the wounded mans voice came over the ground to him: "Oh, you damned fool! I—I'm done for. C-call my daughter, Miss Jess— Oh, God!" he moaned horribly.

It was Jessup! Jessup trying to ride and urge help for the station! Jerry leaped to his feet and ran in the direction of the voice. He came upon two figures in the gloom: one prostrate and writhin; the other doggedly defensive. "I'm sorry, but orders is orders. I challenged him fair enough an' he wouldn't stop. I didn't aim to kill."

Jerry, the first one on this scene, took Jessup in his arms and started back to the station. He was met by excited men, carrying lanterns and pocket flashlights. They crowded him in close pursuit. He was limping again and none too strong; but he ordered them back and alone he carried Jessup, who was bleeding badly.

"Get a doctor, some of you!" Jerry cried; and made for Jessup's house.

Before the doctor could arrive, Jo did what she could; but she had seen enough to know that her father couldn't live. She and Jerry kept all others from his room.

The dying man turned glazed eyes to the youth beside his bed. With awful effort he mumbled: "Now you'll have to—to—" His gesture toward Jo the last he ever made, was eloquent.

Jo bent over him. "He will, father; he will, and—" But there was no need to finish, for Jessup could not hear.

It was the next that the new superintendent, one Hornby, humbled by the presence of death, came to Jerry with unaccustomed mien.

"Martin," he said, "I've something to tell you. I'm the superintendent here now, though I hadn't hoped to get it this way. That's enough for me, I guess, and I know when I can't have anything. A letter came for you about some money in the States that an aunt left you. It wasn't much—but I burned the letter because—well, you know why. I—I saw, that night down on the ledge—and you can get out now whenever you want to." He turned and walked away.

Thus it was that a sandy-haired youth, tall and a trifle too thin, and a girl young and almost pretty, sat back to back on an old Irish "jaunty," laden with bags and a banjo, its case in disreputable condition. As they turned into the Cahirciveen road, two figures—a little Cockney and a kindly man of fifty—stood arm in arm, watching them jog into distance.

"Blimy!" one mused aloud."That's the end of 'em!"

"No," said the other, "that's the start of them." But the first never knew what he meant.—EVERYBODY'S MAGAZINE.

THE Third Annual Chicago Radio Show, the largest and most complete exposition of its kind ever presented in America, opened in the enlarged Coliseum in Chicago with appropriate cermonies, at One o'clock on November 18, and continued until midnight, Sunday, November 23. The huge exhibition was open to the general public from 1:00 P. M. to Midnight daily. The admission this year was fifty cents to all and there was no war tax.

A Book About Success

F. E. d'HUMY has written a book about SUCCESS which should be read by every telegraph, telephone and railroad official and employee.

The author has long been a student of the circumstances and forces which are related to personal progress and in this new book he has presented a concept of the subject which enables any one who can read to gain new footholds along the path of life.

This work on SUCCESS is practical. It points out the essentials of abjective and character which may be cultivated to advantage by the individual.

Copies of the book may be obtained from Telegraph and Telephone Age, 253 Broadway, New York, at the price of one dollar per copy.

Prime's Life of S. F. B. Morse

THIS work was authorized by the family and executors of the great inventor, compiled from original data. It includes the history of the invention of the telegraph and the many important business connections with those who were interested with Prof. Morse in the development of the telegraph; sheepskin; 775 pages; illustrated; $3.00.

Remit to and address Telegraph and Telephone Age. 253 Broadway, New York.

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Communication from Its Earliest Inception to Date

By Clarence H. Mackay

On Wednesday evening, November 26th, Clarence H. Mackay, President of the Mackay Companies, the Commercial Cable Company and the Postal Telegraph-Cable Company, delivered a very able and interesting address on the subject, "Communication From Its Earliest Inception to Date," which is reprinted in full in this issue. This address was broadcasted through WJY, New York City, one of the principal broadcasting stations of the Radio Corporation of America, as a part of the programme in connection with the attempt to reach Great Britain and Europe during the International Radio Week.

Coming, as they do, from the head of the largest combined cable and land-line telegraph system in the world, Mr. Mackay's remarks are authoritative and constitute a prophecy regarding the continued growth and value to the world of the modern system of electrical communication, which really had its beginning in the Morse invention.

Mr. Mackay's statement that the telephone and radio are supplemental to, rather than competitive with, the telegraph and ocean cables is particularly interesting to those who have, perhaps, been apprehensive that the wireless, or radio, will ultimately supplant the old established methods.

It is a coincidence that the Age of December 1st, 1894—just thirty years ago—published an announcement of Mr. Mackay's arrival in this country with the intention to make his future domicile here and assist his father, the late John W. Mackay, in looking after the, then, already vast Mackay interests. Events have shown this item—which referred to Clarance H. Mackay as "of promising material, already a favorite with those who surround him"—to have been prophetic also. We trust that Mr. Mackay's favorable prophecies, as to the future of world communications, will turn out to be equally true.

Mr. Mackay said:

"Ladies and gentlemen of the radio audience, I feel that it is a great honor, as indeed it is a great pleasure, to be invited to address what, I am assured, is likely to be an international audience, during these trans-atlantic broadcasting tests. There is something almost appalling in the knowledge that messages sent out from this wonderful station will carry, practically instantaneously, to those who may be in remote places; that with the power of this station behind it, my voice will reach men thousands of miles away, and reach them faster than it would if I were to go out into the street and shout to some man only a few hundred feet away. Engineers have measured the speed of electrical impulses at something like one hundred eighty-six thousand miles per second, whereas ordinary sound travels at only about one thousand one hundred forty feet per second. To make use of the greater speed, rather than the lesser, is the triumph of electrical communication in all its departments, for while my voice is going out through the air across the Atlantic, messages are being transmitted through submarine cables more than two miles below the surface of that ocean.

There may be those who wonder at the fact that the head of a system of cables and land-line telegraphs, should be a speaker on this program. Yet I am conscious of a sense of fitness that there should be present and active in these events an exponent of the art of wired communications—present, let me say, not as a "landmark" by which to note the advance of Radio, not as a symbol of things outworn and no longer serviceable to mankind, but rather in a fraternal and encouraging spirit, feeling as an older brother would feel at a demonstration of prowess by his own kith and kin.

Frankly, I have no feeling of being an outsider. The telegraph has seen another art of communication rise before the birth of Radio—the art of telephony. Today the telegraph and telephone everywhere supplement each other; they even operate over the same wires in multiplex circuits and cablegrams are both started and delivered by telephone. Lately Radio has become a member of this communications entente. It is practically impossible to discuss the cable, the telegraph, the telephone or radio alone in their relation to civilization, without discussing the others also. The truth is that we must consider electrical communications as a whole whenever we attempt to indicate how great a part any of these intelligence transmitters play in the affairs of mankind.

The era of electrical communications is still in its early youth. However, we of the cable and the telegraph have a background of nearly eighty years and compared with us radio is the merest infant—one of those amazing infants for whom no twin may be found in all the annals of human achievement.

I remember that David Sarnoff, one of the brilliant officials of the Radio Corporation of America, once called attention to the fact that the world today retains and uses every facility of communication that has ever been developed. That is an interesting fact and it holds ample comfort for those who may have any fear of being placed upon the shelf. However, as I have said, we of the wired communications art look upon radio not as rivals, but as friends joined in the fellowship of service to mankind. The cable and telegraph render their own essential and important functions in this service. They cannot be supplanted. They are being supplemented. And I, for one, welcome the new art for its supplementing power.

I may say that mine are not idle expressions of friendship as between telegraph and radio. My companies are already in the third year of their co-operation under contract with the Radio Corporation of America for the collection and delivery of wireless messages of European destination and origin. When I was questioned many months ago by those who had been surprised at the negotiation

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f that contract, I made it clear that the Mackay ystem did not regard radio as a competitor but s a welcome addition to the communications facili- es of the world and I take pleasure in saying that othing has occurred since that time to cause me to egret that expression of unselfish good will.

Nearly fifty years ago, Sir Robert Morier wrote hat for all practical purposes this earth was shrinking to the proportions of a middle sized nedieval state." If that was true fifty years ago, vhat shall be said now in these days of radio? f Sir Robert were here tonight, I wonder what imile he would employ—a pocket handkerchief, erhaps.

Morier was marvelling at the sudden advance of ommunications marked by the commencement of elegraphy. In a few years' time he had seen more dvance made in the art of communications than ad been accomplished throughout all the history f mankind.

Before the era of electrical communications, the reatest communications discoveries were the arts f sailing a ship, or riding a horse, of building a oad, simple and familiar matters indeed as com- ared with the stroke of genius which flings the one of the human voice across the remote seas, onveying not merely the words of an address, the utline of a thought, but the authentic manifesta- ion of the speaker's personality.

It was less than a century ago that the era of electrical communication began. The history of communications, until that time, was halting and uncertain. Mechanics, literature and the arts moved ahead as era succeeded era, but their prog- ress was ever hindered and often their greatest potentialities were obscured by the failure of man- kind to provide for his own needs in the matter of communication.

When it is considered that at the beginning of the nineteenth century there was not a mile of steam railroad, not a mile of electrical telegraph or cable, no telephone, no radio, no automobile, in a word, no communications facilities but human and animal legs, wheeled vehicles and wind propelled vessels, one cannot help wondering how the business of the world was transacted as satisfactorily as it was.

Let us digress for a moment to fling a hasty glance across the score of centuries that preceded the era of electrical communications. Being a gregarious animal, man felt the need of communication from one tribe to another almost as soon as the desire of association and mutual protection had led to the organization of the tribe. We see at first the runner, chosen for his speed and endurance, prototype of that Marathon athlete who brought to Athens the glorious news of victory over Persia. We see in turn the development of signalling devices and codes of alternating smoke and flame, whereby the orders of a Roman general were flashed from point to point—we see, in short, the first wireless. Then the runner gives place to the mounted messenger, the man on horseback, the camel rider and he who used the sailing ship for transport. And, having seen all this, we have seen the history of communications up to the time of electricity.

The freeborn citizen of Rome in the time of Cicero was no worse off than a Frenchman of Napoleon's day in the matter of communications.

My friends in England who may be listening in will not, I am sure, challenge the statement that England, no less than other countries, was back- ward in providing means of communication, chiefly because of her wretched roads. The great route through Wales to Holyhead was in such a state that as late as 1685 a Viceroy on his way to Ireland was five hours in traveling fourteen miles.

Perhaps the most striking incident in American history illustrating the cost of inadequate com- munications is the bloody battle of New Orleans. In that battle hundreds of men died whose quarrel had already reached an honorable adjustment in the Treaty of Ghent. The battle began the day that Treaty was signed.

America made an outstanding and romantic con- tribution to the development of communications be- fore the real expansion of telegraphy had begun. It was the Pony Express. The story of the Pony Express is fascinating. It was established in 1859 at the suggestion of Senator Gwin. There were five hundred horses, one hundred and ninety relay stations, and eighty first-class riders. Among the latter, the famous Buffalo Bill was soon numbered. Letters had to be written on tissue paper and the postage at first was $5 for less than ½ ounce. Even the expert, lightly armed riders took ten days to reach the Pacific Coast from Missouri.

Against this background of hindered growth, of unconquered obstacles, there suddenly dawned, in the Nineteenth Century, the era of electrical com- munication. It was as if the genius of mankind for communications, pent up for all the centuries be- fore, had swiftly burst its bonds, resolved to atone for all past backwardness.

It was in 1844 that Samuel F. B. Morse re- vealed to the world the great invention of the tele- graph. 1850 is the first big date in the history of submarine cables. In that year a thirty-mile cable was laid from Dover, England, across the English Channel, the culmination of many years of theoriz- ing and experiment. It was the first of many ven- tures and preceded by eight years the spanning of the Atlantic by submarine cable, made possible by the genius of that great American, Cyrus W. Field.

And now the art of communications moved at a giant's pace as contrasted with the slow progress of the centuries before. Scientific genius concen- trated upon the problem of improving the art. Or- ganization genius was concentrated upon the ex- pansion of service. Financial resources were pro- vided in abundance and the great American spirit of competition that has so outstandingly character- ized our material achievements, was seen in some of its most colorful chapters.

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It is gratifying to know that America now leads, leads not only in radio, but in the entire field of electrical communications. Our census reports for 1922 show 76,711 nautical miles of ocean cable and nearly two million miles of single wire owned and leased for land-line purposes. The combined cables and telegraphs of America handled nearly two hundred million messages in 1922—a volume that has been vastly increased since that record was made. The Department of Commerce reports in 1923 a total telephone wire mileage of more than thirty-four million miles and the ownership of more than fifteen million telephones, exchanging nearly forty-three million messages daily.

In the field of radio we find more than five hundred American broadcasting stations, sending out their daily programs of music, lectures, news and other entertainment to something like five million owners of radio receiving sets.

Could anything be more amazing, more impressive than this vast development which has taken place in less than eighty years? The communications system of America is one of the greatest monuments to America's many sided genius. In viewing it thus, as a united organism of public service, let us not ignore the fact that it is also a monument to individual enterprise and initiative. It could not have been accomplished except in the typically American way of untrammelled action. The giant grew without being fed upon the nursebottle of bureaucratic control. Perhaps he could not have survived pampering, coddling and interference.

There was a time when the difficulty of communication prompted alliances among the nations. The dangers and inadequacies of the roads and posts really called into existence the famous Hanseatic League. About 1241 the League inaugurated a kind of regular messenger service to facilitate commercial and financial transactions among its member cities. Powerfully armed vessels protected the League's commerce at sea against Scandinavian pirates. The roads were used for communications in all directions. Only the merchants of the Hanseatic League and of Venice could at that time count upon a certain degree of international communication.

And today we witness a different sort of development. We see communications as a positive and compelling force drawing men and nations together by the mighty force of sympathy and understanding.

There was high appropriateness in the fact that Owen D. Young, the presiding and organizing genius of Radio in America, was the associate of General Dawes in rendering such vital services in eradicating after-war misunderstandings. In his two missions abroad, wherein he wielded such extraordinary power for good, Mr. Young, I like to think, personified the ideal and spirit of communications.

It has often been said that the war set civilization back many centuries. In many respects that is true. In many respects it is untrue. Today there is every evidence of a spirit of unbeatable optimism in the world at large—not to ignore the splendid confidence that permeates the business world both here and in England. The lessons of the war seem to have been exposed in the white light of transmitted intelligence.

Perhaps many of you listened and were impressed the night before election by the utterance over the radio with which President Coolidge brought the campaign to a close. He spoke no longer as a candidate or partisan. It was the voice of the President of the United States that we heard—the voice of a great President, summoning his fellow citizens to the performance of a high duty in accordance with the dictates of their conscience.

It is not difficult to forecast the time when the voice of some great English speaking leader may sound his appeal to friends and followers on both sides of the Atlantic. There is an old saying of our elections, not always true, indeed, that "As New York goes, so goes the Nation." May it not ultimately come about, through the cementing of opinion and sympathy, that in the great affairs of mankind, "As America goes and England goes, so go the nations of the world."

Communication is the reconciler of differences, the promoter of understanding—it levels up, not down. We who stand today on the threshold of the age of international broadcasting, may well be thrilled and inspired by the belief that a liberalizing and constructive force of immeasurable momentum has been generated. God speed the day of its full action upon the history of mankind. All honor and praise to the great engineers and guiding geniuses of the Radio Corporation of America."

West India and Panama Telegraph Co.

THE extent of the financial crisis in the affairs of the West India and Panama Telegraph Company may be judged from the fact that the Cuba Submarine Telegraph Company is prepared to offer 1s. per share for the £10 Ordinary shares, 2s. 6d. per share for the £10 Second Preference shares, and 5s. per share for the £10 First Preference shares. For the Debenture stock it is offering £65 per £100. The offer represents a total cash payment of £71,880 for securities of a nominal value of £1,365,130, but the figure appears to be more than would be obtainable if the West India and Panama Telegraph Company went into the hands of a receiver. The company has been working at a loss for some years, no dividends having been paid on the Preference shares for 3½ years, and the last balance sheet showing a debit balance of £82,000.

This crisis has been hastened by the fact that the subsidies from the Imperial, Canadian, and West Indian Colonial Governments have come to an end.

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EDITORIAL COMMENT

Christmas Greetings

WE wish all of our readers a Merry Christmas d a Happy and Prosperous New Year. In so ing we once more call attention to the fact that s publication is headquarters for everything that egraphers require The office of Telegraph and elephone Age is a clearing house for all those ho wish to deal direct with New York manufac- rers. A trial order will be sufficient to test the ture of our guarantee. Give us a trial.

Were Afraid to Use Pioneer Telephones

One of the arguments advanced in favor of the lephone when Alexander Graham Bell's new in- ntion was in its infancy was the great advantage possessed over every other form of electrical ap- ratus in that it required no skill to operate the strument. Strange as it may seem today, many eople were under the impression that, like tele- raphic instruments, the telephone required special nowledge in order to use it and they feared to ave it installed lest they might not be sufficiently xpert or have the necessary skill to operate it.

Simplicity of operation has from the beginning een one of the principal points in favor of the lephone, but in the late seventies there were many ho believed that they could not use the telephone uccessfully unless they had been skilled in elec- icity.

The fact that the telephone was so easy to perate was one of the principal arguments used n bringing it to the attention of the public and in etting people know what it could really do.

In those early days women frequently experienced uch a thrill at hearing a voice over the wire that ney actually fainted when they used the telephone or the first time, and many persons had to be oaxed and assured that there was no danger before hey would even pick up the receiver and attempt o carry on a conversation.

Annual Entertainment and Reception of the New York Telegraphers' Aid Society

THE forty-fourth annual entertainment and recep- ion of the New York Telegraphers' Aid Society, n behalf of the Relief Fund was held at Terrace Garden, East 58th Street, New York, on Friday evening, November 21st. The weather was de- ightful and brought out the faithful followers of he old Aid Society in such numbers that the hall was somewhat uncomfortably filled.

As usual an entertaining bill of high class vaude- ville was presented and the reputation of the so- ciety in this direction was well maintained as in other years.

The feature of the evening, however, was the concert given by the Western Union Messenger Boys' Band, of forty pieces under the direction of Major Ernest A. Hopf. The efforts of the little chaps followed by the regular performance and judging from the applause that greeted them, they must have felt proud indeed.

The officers of the society are: Charles J. Lemaire, President; Daniel J. Condon, Vice-President; Thomas M. Brennan, Treasurer; Charles A. Kilfoyle, Financial Secretary, and F. J. Sheridan, Recording Secretary.

The entertainment, as usual, was handled by the well-known Robert J. Marrin, Chairman of the Entertainment Committee, assisted by James P. Clolery and Walter Redlefsen. The floor arrangements were looked after by Farrell J. Sheridan, Arthur F. Kavanaugh and Joseph N. Kelley. The reception committee was headed by William J. Quinn and his able assistants, John F. E. Hopkins and Walter Redlefsen.

The members of the various committees and the officers deserve great credit for the high-class performance given and the enjoyable evening afforded and, no doubt, the Relief Fund will benefit in a substantial manner as a result of their efforts.

Marconi Wireless Telegraph Company Stock

P. C. KULLMAN & COMPANY, 110-116 Nassau Street, New York, the well-known wireless stock brokerage house, selling the stock of the Marconi Company, has just issued a ten-page circular dealing with thirty-three reasons of holding Marconi Wireless Telegraph Company, Ltd., stock and trading in and trading out of the market. The entire ten pages make up an interesting enumeration of reasons why investors should buy the stock of the Marconi's Wireless Telegraph Company, the original parent company, which has associated and subsidiary companies in more than thirty foreign countries, maintaining offices and representatives in more than fifty foreign capitals all over the world. The company has an uninterrupted dividend record of twelve years behind it. The capital is very low, being only four million pounds sterling. The stock has always sold above par for more than twelve years past.

20,000 New Telephones for Detroit Each Year

THE telephone is growing in Detroit at the rate of about 20,000 instruments a year. Recently Detroit's 200,000th telephone was installed. In 1877 there were but two telephones in Detroit and they were in use between the drug store of Frederick Strearns and his laboratory and chemical shop. By a coincidence the 200,000th telephone was placed in the home of an employee of the firm, the founder of which was the first user of the telephone in Detroit.

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Graphical Pole Line Calculations

By J. L. Niesse, Telegraph and Telephone Engineer, New York Central Lines, New York

Introduction:

It is the purpose of this article to describe a simple and easy method of graphically calculating the strength (factors of safety) of wood pole lines of standard construction as used in the telegraph and telephone service.

By standard construction is meant the types of construction usually followed by the railroads and wire using companies in so far as they relate to depth of setting and location of cross arms. The standard depths of setting and spacing of cross arms as adopted by the American Railway Association are shown in Figure 2 on the diagramatic pole figures. For instance, the poles for a fifty wire pole line of 25 foot class AA poles are assumed set to a depth of 5.5 feet while the cross arms are assumed spaced 2 feet apart, with the top one 8 inches below the top of the pole, which will place the top wires about 6 inches below the pole top. Other than upon these two considerations, setting and cross arm location, the details of construction may vary without affecting results in regard to strength.

The classification of poles as AA, A, B, etc., is that adopted by the American Railway Association, and it is upon the sizes shown in this classification that the calculations are based. These are practically the same as those of the Western Union Telegraph Company except for class D cedar, of which the dimensions are different, and for 25 foot class A chestnut where the Telegraph Company is 1 inch smaller in circumference 6 feet from the butt.

In presenting the chart shown in Figure 1, it is with the thought that it will be of assistance to those who do not find the time to familiarize themselves with the mathematical formulae or do not wish to work through the actual calculation even though they may be conversant with the method. In addition it will be a great convenience to those who have many calculations to make or considerable checking to do. While it is realized that there are a number of tables in existence from which pole lines may be selected to give a definite factor of safety, they are limited in their scope to the particular factor of safety upon which they are based. Conditions frequently arise where it is desired to determine factors of safety different from those shown in the tables, such as at wire crossings, etc., or for different spacings, loadings or fibre stresses than those shown in the table. For such conditions the chart will be found of considerable convenience.

Descriptions and Use.

A brief description of the chart shown in Figure 1 and the scales marked upon it follow.

At the bottom is a scale for the number of wires to be carried by the line, as 10, 20, 30, etc., which figures are associated with the vertical lines of the chart. Intermediate numbers of wires may be used by counting the one-tenth division marks between any two numbers, as for instance, 23 wires would be on the third vertical line to the right of 20. Between 10 and 20 the tenth divisions are again divided in half so that for this part of the scale it is necessary to count two lines for the next number, that is, 15 is the tenth line to the right of 10.

On the sides of the chart are the factor of safety numbers running from 1 to 10, which are associated with the horizontal lines of the chart. As described for the wires the intermediate lines give the tenths. For instance the second horizontal line above 2 would have a value of 2.2, the third line, 2.3. For greater accuracy the space between the tenths may be further subdivided by estimating the distance, a reading half way between 2.2 and 2.3 would be 2.25.

At the top of the chart are three scales, all of which belong to the diagonal lines, sloping to the left some of the lines serving for more than one scale, as for instance, the diagonal at 6 is also used for the Number of Poles per Mile 60, and Fibre Stress 6000. To secure additional values for readings other than those shown it is only necessary to draw parallel 45 degree diagonal lines, for instance, for a wind pressure of 7.2 pounds per square foot, a spacing of 72 poles per mile or a fibre stress of 7200 pounds per square inch, a 45 degree line would be drawn from the edge of the top scale two divisions to the right of 7 or at 7.2. The curves are based on a fibre stress of 5100 pounds per square inch for chestnut and in using the chart for other fibre stresses they must be confined to poles that are of the same dimensions as the chestnut.

For means of illustration of the use of the chart assume the following problem:

Number of wires, 50; class of poles, AA chestnut; wind load, 8 lb. per sq. ft.; number of poles per mile, 70.

To find the factor of safety:

1. Starting with the 50 wires at M project vertically to the AA line at N.
2. Horizontally to the 10-10 diagonal base line at O.
3. Vertically from O to the diagonal line representing the desired wind load, in this case 8 lb. wind at P.
4. Horizontally to the diagonal line representing the desired spacing, in this case 70 per mile at Q.
5. Vertically down to the 10-10 base line again as at R.
6. From R project horizontally to the factor of safety scale as at S and read the result, in this case about 2.06.

The chart is based on chestnut wood of maximum fibre stress of 5100 pounds per square inch. Suppose it is desired to find the factor of safety for a pole of a different fibre stress, say 6000 pounds per square inch.

7. From R project horizontally to the diagonal line representing the desired fibre stress, in this case 6000 pounds per square inch at T.
8. Now vertically up (or down) to the 5100 base

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ne as at U.

9. From U project horizontally to the factor of afety scale as at V and read the result in this case bout 2.42.

While the above method illustrates the one that s most easily followed, the projections can be made n any order, and it will sometimes be found more onvenient to find first the change due to fibre tress.

While the above description may at first give the dea that the use of the chart is a lengthy or com-licated process such will not be found to be the ase. The rather detailed and lengthy explanation vas purposely given to avoid any possibility of mis-nderstanding. Actually working an example or wo will quickly convince one that the whole cal-culation will only require a few seconds.

The example assumed the factor of safety as the nknown. The process, however, can be reversed and the factor of safety may be assumed with the number of wires as the unknown and the method reversed.

METHOD OF CONSTRUCTION OF THE CHART.

The method employed in the construction of the chart will now be given for the benefit of those interested in this phase of the subject so that anyone desiring to do so may readily construct charts for other conditions than those given.

A pole in a telegraph and telephone line is what is usually termed a cantilever beam, a beam fixed at one end with the load P applied at the other. This load has a tendency to overturn the pole and is resisted by the internal stress in the timber, tension on the side away from which the pole is being forced and compression on the other. This results in two opposing moments of force, one external and the other internal, which are always equal to one another.

The external moment M is the force applied in pounds times the distance of this force from the ground line.

The internal moment is the internal fibre stress, S, times a factor called the section modulus equal to $\frac{\pi d^3}{384}$. Now as these are equal we may write $PL = S\frac{\pi d^3}{384}$ where P is the force applied in pounds, L is the distance in feet of the point of application of the force above the ground line, S is the fibre stress of the timber in pounds per square inch and d is the diameter of the pole at the ground line in inches. Assume certain conditions which may be called the base conditions, as follows:

Poles spaced 100 per mile.

Wind of 10 pounds per square foot.

Wires covered with ½ inch ice, ⅓ No. 9 AWG and ⅔ No. 8 BWG.

Poles of chestnut, maximum fibre stress 5100 lbs. per square inch.

Poles of the class and set as shown in Figure 2.

The transverse force per foot of wire is

$$\frac{1.148\times12\times10}{144}=0.956 \text{ pounds,}$$

and per wire per pole is

$$\frac{5280\times0.956}{100}=50.5 \text{ pounds.}$$

For 30 wires carried on a class B pole the external moment is 30 x 50.5 x 13 = 19,700 foot pounds. This, as stated before, is equal to the internal moment. Now the internal moment divided into the maximum internal moment the pole is capable of developing will give the factor of safety. This maximum moment is developed when the timber is stressed to it's maximum fibre stress, which in this case was assumed as 5100 pounds per square inch.

From the pole tables the diameter of a 20 foot class B pole is found to be 9.8 inches at the ground line.

The maximum internal moment is therefore

$$\frac{5100 \text{ x } 3.14 \text{ x } 9.8 \text{ x } 9.8 \text{ x } 9.8}{384}=39{,}500 \text{ ft. lbs.}$$

and the factor of safety, $\frac{39500}{19700}=2$

In like manner the factors of safety may be calculated for the remaining wire loads from 10 to 80. If these are plotted on a sheet there will result a curve showing the variation of the factor of safety, with the number of wires for all classes of poles spaced 100 per mile and subject to a load of 10 pounds of wind per square foot of projected area of wires coated with ice ½ inch in radial thickness.

For a given number of wires the factor of safety varies: inversely as the wind load, that is, if the wind decreases to 8 pounds the factor of safety increases by 10/8; directly as the pole spacing, that is, if the number of poles per mile is decreased to 70 the factor of safety is decreased by 70/100; and directly with the fibre stress of the timber.

It can readily be seen that having plotted the curves for 100 chestnut poles per mile under 10 pounds wind, if means can be found of multiplying and dividing the plotted factors of safety graphically the problem will be solved.

This brings up the consideration of logarithms. A logarithm of a number is the power to which another number called the base must be raised to give the first number. In the natural system the base is 10 and if 10 is raised to the .30103 power it will equal 2. In other words, .30103 is the logarithm of 2. Now if the logarithms of two numbers are *added* their sum is the logarithm of the *product* of the two numbers, while subtracting the logarithms has the inverse effect of dividing the numbers. This is exactly what is done mechanically in the case of the ordinary slide rule.

Cross section paper as shown in figure 1 is ruled the same as a slide rule so that the distances shown correspond to the logarithms of the numbers from 1 to 10, that is, the distance from 1 to 2 is equal to .30103 of the total distance from 1 to 10. Instead of calling it .30103, however, *the number of which this distance is the logarithm is used.* As stated before, adding the logarithms is equivalent to multiplying the numbers and if the paper is correctly laid out one should be able to add the distance from 1 to 2 to that from 1 to 4 and have the total equal

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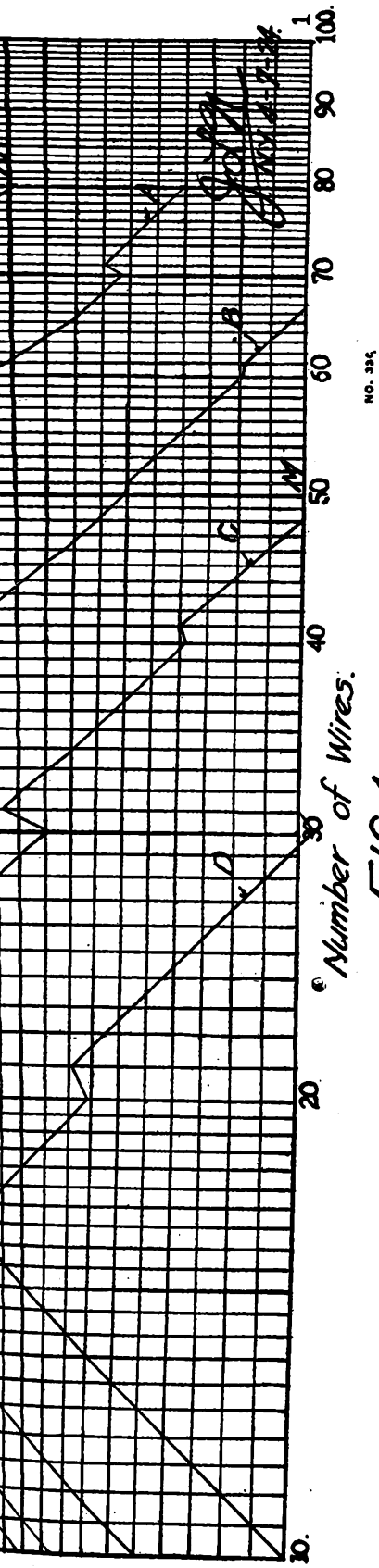

FIG. 1.

Number of Wires	Length of Pole Feet	Pole Diagram — Class of Pole. Center of Load. Depth of Setting.
10	20	AA&A B C&D 14.5' 15' 15.5' 5' 4.5' 4'
20	20	AA&A B C&D 13.5' 14' 14.5' 5' 4.5' 4'
30	20	AA&A B C&D 12.5' 13' 13.5' 5' 4.5' 4'
40	22	AA&A B C&D 13.5' 14' 14.5' 5' 4.5' 4'
50	25	AA A&B C&D 15' 15.5' 16' 5.5' 5' 4.5'
60	25	AA A&B C&D 14.8' 15.3' 15.8' 5.5' 5' 4.5'
70	30	AA A B,C&D 18.5' 19' 19.5' 6' 5.5' 5'
80	30	AA A B,C&D 17.7' 18.2' 18.7' 6' 5.5' 5'

FIG. 2.

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to 1 to 8. By marking the distance from 1 to 2 on a straight piece of paper and then moving the paper so that the mark corresponding to 1 rests on 4 the mark corresponding to 2 will be found to rest on 8.

Another characteristic of these scales is that as long as the same ratio is maintained it makes no difference what numbers are assigned, that is, all the numbers may be multiplied by the same factor and the products assigned to the scale. In the case of the number of wires all the primary scale numbers were multiplied by ten, for the fibre stress by 1000.

From the above it is readily seen that logarithmic paper is an ideal means for the solution of the problem. Having plotted the factors of safety against the number of wires for 100 poles per mile and 10 pounds wind on the logarithmic paper, it may be changed to any other basis such as 8 pounds wind and 53 poles per mile by simply graphically adding and subtracting the logarithms corresponding to these numbers.

For instance, in the problem the factor of safety for 8 pounds wind and 100 poles per mile was obtained by projecting from O to P. This in effect consisted in the following graphical calculation: log 2.33+log 10 — log 8.=log 2.91, which is the same as

$$\frac{2.33 \times 10}{8} = 2.91$$

the new factor of safety for 100 poles at 8 pounds wind.

That projecting from O to P is subtracting the long 8 from the long 10 may not be evident at first. By looking at the top scale of wind load however, it may be noted that the line O terminates at 10 and the line P at 8 and the horizontal distance along this scale between 10 and 8 is of course log 10 — log 8. Now since the lines are drawn at 45 degrees a vertical and horizontal projection are always equal, hence from O to P is equal to the distance from 10 to 8, or log 10 — log 8.

The next move in the problem was to obtain the factor of safety for 70 poles per mile. This was done by projecting from Q at 2.91 to R at 2.08. This is simply the inverse of the previous. Then the difference was added, since it was positive; now it is subtracted, since it is negative. This may be seen from the following:

f.s. is 2.91 for 100 poles per mile

f.s. is $\frac{2.91 \times 70}{100} = 2.08$, factor of safety for 70 poles per mile, or log 2.91+log 70 — log 100=log 2.08; log 100 being larger than log 70, the difference is negative and must be subtracted.

Whether the difference is positive or negative need not concern any one using the chart as it automatically takes care of it.

The above, it is felt, gives a description of the method followed in constructing the chart and it is hoped has made clear the principles of the use of logarithmic or "ratio" paper, both for the particular problem concerned and for any other problem that involves the same characteristics.

Aviators Versus Operators

THE Traffic Production Department of the Radio Corporation of America is now urging its patrons in interior cities to use the United States air mail service for the purpose of filing trans-oceanic messages—particularly week-end and deferred messages—in New York and San Francisco and is undertaking to deliver such messages in the same way.

For example, a message posted in Chicago "via air-mail" in time to catch the 7:30 A. M. flight from Chicago will be received that same night by the Radio Corporation's office in New York and can be delivered in Europe the next day; in a total elapsed time of twenty-four hours.

It is computed that the air mail postage plus the deferred tolls amounts to less than the regular full tolls on the average deferred message of twenty-two words.

This is a unique method of collection and delivery of "cablegrams" and one which is calculated to put the old cable and land-line companies upon their mettle, although in earlier days the slow service rendered at times by some of the old companies has stimulated the humorous writers to accuse the companies of using the mails for the transmission of messages.

The United States Air-mail service now causes this particular accusation to cease to be a joke and moreover the air mail may eventually prove to be a serious competitor to the telegraph companies and one that has never been contemplated by the old managements, however far-seeing and progressive they may have been.

Wireless Education

THE use of wireless in schools is receiving strong encouragment from the British Broadcasting Company, which is extending its program of educational lectures during the winter months. At many schools the pupils now listen-in, and the first wireless examination will be held shortly, the subject being history. The first and most obvious advantage of education by wireless is that it breaks the monotony of the classroom. A talk on travel, for example, by Hilaire Belloc, which it is proposed to broadcast, will help to make geography not a dull struggle with names, but a living subject. Sir Oliver Lodge speaking simply of scientific things will stimulate the young mind to regard chemistry as a fascinating romance. Both the method and the manner of wireless education will make the acquisition of knowledge easier, for it has been proved beyond question that a mind arrested and interested is a mind informed. The very instrument by which the knowledge is transmitted is something to fascinate and stir the imagination of children. They become at once all ears for what shall come out of the magic box. Curiosity thus aroused, the mind becomes alert, receptive, and sympathetic. How can the pupils fail to profit by lessons which are also a form of entertainment.

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THE KLEINSCHMIDT
TELEGRAPH TYPEWRITER
AN ENTIRE SYSTEM
IN

ONE SIMPLE TYPEWRITER UNIT
Not Merely A New Design.
A Revolutionary Change.
The Unit that proves in on lightly loaded circuits.

Kleinschmidt Electric Co.
LONG ISLAND CITY, NEW YORK

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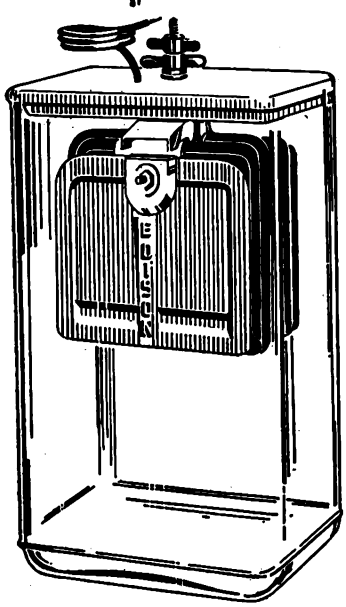
Garwood, N. J. Chicago

MANUFACTURERS OF THE
GILL SELECTOR

THE UNIVERSAL SELECTOR
FOR
TELEGRAPH AND TELEPHONE



TELEPHONE ENERGY
When You Need It

The transmitter battery, for way station service, is, in most cases, on open circuit a large portion of the time. Accordingly, it should not suffer from shelf depreciation or internal losses when the circuit is open.

On the other hand, emergencies may and do arise, which subject the battery to long periods of closed circuit work. If, under such conditions, the battery tends to polarize the transmission is impaired.

No other type of primary cell can compare with the caustic soda in meeting these conditions, and this fact is recognized by the roads that give due consideration to these important details.

Let us tell you about comparative costs.

Thomas A Edison, Inc.
EDISON SIGNAL BATTERIES-PRIMARY and STORAGE
BLOOMFIELD - NEW JERSEY

ST. LOUIS
Railway Exchange Bldg.

CHICAGO
Peoples Gas Bldg.

SAN FRANCISCO
Balboa Bldg.

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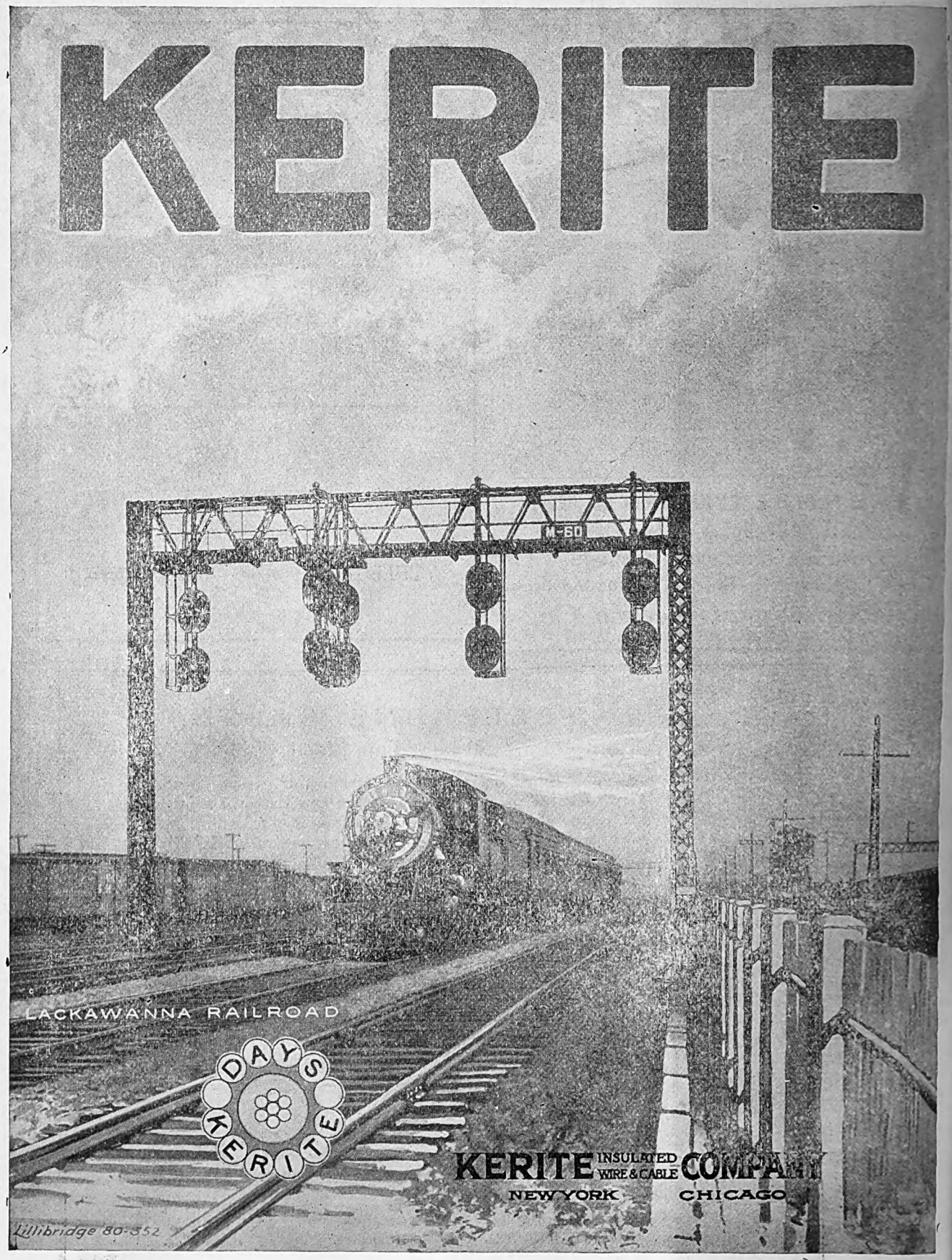

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THE RAILROAD

Telegraph and Telephone Section of the American Railway Association

At the meeting of the Committee of Direction held in Chicago on October 22nd, it assigned work to Committees and appointed Committees for the ensuing year as follows:

COMMITTEE No. 1—CONSTRUCTION AND MAINTENANCE—OUTSIDE PLANT

General review of the intensive work of the last four or five years.

Instructions covering outside plant construction methods.

Specifications for replacement inspection of pole lines.

Terminal construction specifications.

Use of different types of anchors.

Preparation of routine covering storm trouble.

Specifications for underground cable installation.

Specifications for joint high and low tension underground construction.

Pole line diagrams.

Cooperate with the Electrical Section in the preparation of Specifications for joint pole line construction.

COMMITTEE No. 2—CONSTRUCTION AND MAINTENANCE—INSIDE PLANT

Prepare specifications covering quadded office cable and such other manufacturing specifications as may be required from time to time to cover articles which have been specified or which it is anticipated will be specified.

Prepare specifications for locations and layouts for general and relay telegraph offices and private branch telephone exchanges.

Prepare text and drawings for circuits required in railroad telegraph and telephone plant.

Prepare specifications for typical schemes for supplying current for railroad communication service.

Prepare routine for electricians and installers which will cover proper methods in installation work, the care of tools, supplies, etc.

Prepare specifications for standard dispatcher's table and standard telegraph operator's table.

COMMITTEE No. 3—PROTECTION AGAINST ELECTROLYSIS

Report the work being done by other organizations on the subject of protection against electrolysis.

COMMITTEE No. 4—ELECTRICAL PROTECTION

Formulate a set of principles covering protection against operating voltages and currents which will serve as a guide to other Committees of the Section.

Prepare requirement specifications for a limited number of protective devices to be used in application of the principles formulated.

COMMITTEE No. 5—COMMUNICATION DEVELOPMENT

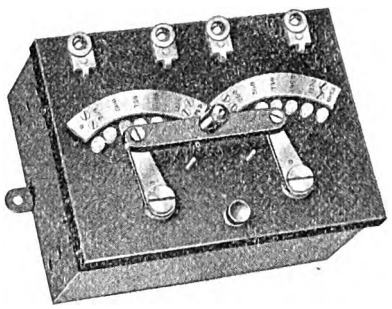
Collect data and make report on the latest developments in communication apparatus and practices that will be of interest and value to the representatives of members.

COMMITTEE No. 6—MESSAGE TRAFFIC

Give consideration to the revision or elimination

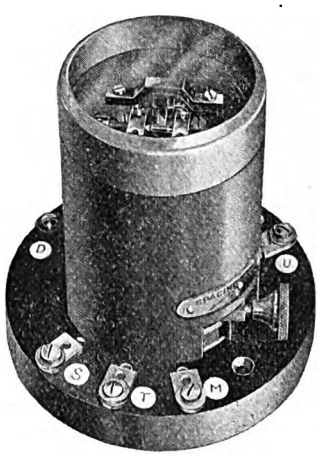
Don't Forget that while we are the World's largest manufacturers of Printing Telegraphs, we also make—

SLIP BASE WHEATSTONE RELAY



ADDED LINE RESISTANCE BOX

JACKS



WHEATSTONE RELAY

MORKRUM COMPANY

CHICAGO
1410 Wrightwood Avenue

NEW YORK
726 World Building

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of "Classification Telegraph Service 6-3," in the Manual.

Make recommendation for establishing a uniform period to preserve message files.

Standardize all message and report forms preferably for use in typewriters.

Consider installation of selectors on Morse Telegraph circuits in local telegraph offices.

Give further consideration to the extended use of automatic printers.

Make recommendations as to practice of sending telegraphic confirmations of telephone messages or conversations.

Issue instructions on use of railway telephone trunk circuits.

COMMITTEE No. 7—INDUCTIVE INTERFERENCE

Continue consideration of miscellaneous problems in connection with inductive interference.

Complete preparation of discussion of various measures which may be employed to minimize telegraph and telephone interference.

Continue cooperation with the American Committee on Inductive Co-ordination in the study of this subject, and report to the Telegraph and Telephone Section the development of the work of the Committee.

Develop, if possible, constants which would enable one to determine the probable inductive effect from different exposures of communication circuits to power systems.

COMMITTEE No. 8—EDITING AND PUBLICITY

Edit Committee reports and subject matter intended for printing.

Edit proceedings of meetings of the Section.

Harmonize literature and specifications.

Such other duties as may be assigned to it by the Committee of Direction.

COMMITTEE No. 9—FUTURE ACTIVITIES AND TOPICS

Consider subjects that the Committee believes it desirable should be referred to present Standing Committees or on which Committees should be appointed in the future.

Arrange with outstanding experts in the communication field to present papers at the next meeting of the Section on subjects of particular interest to the Section, such papers to be open for discussion, and the Committee to get in touch with representatives of members of the Section to take part in discussions.

COMMITTEE No. 10—EDUCATION AND TRAINING OF TELEGRAPH AND TELEPHONE EMPLOYEES

No subjects assigned until the next meeting of the Committee of Direction.

COMMITTEE No. 11—COMMUNICATION TRANSMISSION

(1) Requirements for efficient railroad communication transmission.

(2) Recommendations for rules and practices beneficial to railroad communication transmission.

COMMITTEE No. 12—RADIO AND WIRE CARRIER SYSTEMS

Continue to keep in touch with manufacturers of wireless equipment and endeavor to have actual demonstrations made of the possible applications which already have been suggested.

Continue studies of the feasibility of securing "Carrier Current" telegraph and telephone operation over existing typical railroad wire plants in the present state of the art.

Make report on these assignments to the Chairman of the Section at the earliest convenience on any conclusive developments, so that the Chairman may, if he considers it desirable to do so, advise the Section immediately of the results of the Committee's study.

Encourage and cooperate to the fullest extent, consistent with railroad practices, with manufacturers and others in developing a simple, reliable "Carrier," or wireless telephone set, that will talk and signal between the rear and head of both freight and passenger trains.

Consider the feasibility of establishing radio communication to be used in emergency when all other means of communication have failed.

Keep in touch with the proposed establishment of a permanent Board of Radio Control and any other legislative activities affecting the status of railroads with respect to the application of radio.

COMMITTEE No. 13—ARRANGEMENTS

Subject to the approval of the Committee of Direction this Committee shall arrange for exhibits and such other matters as may be assigned to it in connection with sessions of the Section.

PERSONNEL COMMITTEES FOR ENSUING YEAR

The following Committees and Special Committees were appointed for the ensuing year:

COMMITTEE No. 1—CONSTRUCTION AND MAINTENANCE—OUTSIDE PLANT

E. C. Keenan (Chairman), General Superintendent Telegraph and Telephone, New York Central Lines, 466 Lexington Avenue, New York. H. A. Shepard (Vice-Chairman), General Superintendent Electric Transmission and Communication, New York, New Haven and Hartford Railroad, New Haven, Conn. E. T. Ambach, Assistant Superintendent Telegraph, Baltimore & Ohio Railroad, Cincinnati, Ohio. C. D. Briggs, Communication Engineer, New York, New Haven and Hartford Railroad, New Haven, Conn. E. A. Burkitt, General Foreman, Telegraph Department, Illinois Central Railroad, Chicago, Ill.

G. A. Dornberg, Chief Lineman, Central Region, Pennsylvania Railroad System, Pittsburgh, Pa. R. F. Finley, Superintendent Telegraph, New York Central Railroad, West of Buffalo, Cleveland, Ohio. A. W. Flanagan, Superintendent of Telegraph, Southern Pacific Company, San Francisco, Cal. M. R. Greenamyer, Inspector, Telegraph Department, Pennsylvania Railroad System, Philadelphia, Pa. E. Kenward, District Plant Superintendent, Canadian National Railways, Toronto, Ont.

J. B. MacGregor, Assistant Superintendent of Telegraphs, Canadian National Railways, Battle Creek, Mich. W. S. Melton, Superintendent Telegraph and Telephone, Southern Railway System,

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Lines West, Cincinnati, Ohio. J. McMillan, Manager of Telegraphs, Canadian Pacific Railway, Montreal, Que. J. L. Niesse, Telegraph and Telephone Engineer, New York Central Lines, 466 Lexington Avenue, New York. C. A. Plumly, Superintendent Telegraph, Baltimore & Ohio Railroad, Baltimore, Md. J. C. Rankine, Superintendent Telegraph, Great Northern Railway, St. Paul, Minn. L. S. Wells, Electrical Superintendent and Superintendent Telegraph, Long Island Railroad, Pennsylvania Station, New York. D. P. Dickie (Consulting Member), Engineer, The Western Union Telegraph Company, 195 Broadway, New York. K. L. Wilkinson (Consulting Member), Engineer on Foreign Wire Relations, American Telephone Company, 195 Broadway, New York.

COMMITTEE No. 2—CONSTRUCTION AND MAINTENANCE—INSIDE PLANT

W. Rogers (Chairman) Telegraph and Telephone Engineer, Missouri Pacific Railroad, St. Louis, Mo. G. R. Stewart (Vice-Chairman), Telegraph and Telephone Engineer, Illinois Central Railroad, Chicago, Ill. E. V. Adams, Railroad Sales Engineer, Western Electric Company, Inc., 100 East 42nd Street, New York. A. Behner, Telegraph and Telephone Engineer, New York Central Railroad, West of Buffalo, Cleveland, Ohio. T. E. Binyon, Telephone Inspector, Southwestern Region, Pennsylvania Railroad System, St. Louis, Mo.

H. K. Clark, Telegraph and Telephone Engineer, Canadian National Railways, Toronto, Ont. R. H. Corson, Assistant Superintendent of Telegraph, Erie Railroad, Paterson, N. J. A. W. Douglas, Assistant Superintendent of Telegraph, Chicago, Rock Island & Pacific Railway, Chicago, Ill. J. F. Hale, Chief Telegraph and Telephone Inspector, Southern Railway System, Lines West, 1301 Market Street, Chattanooga, Tenn. John Hilbert, Telegraph and Telephone Engineer, Union Pacific Railroad, Omaha, Nebr. O. L. McCreary, Assistant Superintendent Telegraph and Signals, Northwestern Region, Pennsylvania Railroad System, Chicago, Ill.

John Miller, Telegraph and Telephone Engineer, Northwestern Region, Pennsylvania Railroad System, Chicago, Ill. J. Mitchell, Superintendent of Telegraphs, Canadian Pacific Railway, Montreal, Que. F. S. Nelson, Telephone Engineer, Atchison, Topeka & Santa Fe Railway, Topeka, Kans. J. P. O'Donohue, Assistant Chief Engineer, Postal Telegraph-Cable Company, 253 Broadway, New York. L. M. Ritchie, Sales Engineer, Railway Sales Division, National Carbon Company, Inc., Cleveland, Ohio. J. N. Schlentz, Telegraph and Telephone Engineer, Chicago, Burlington & Quincy Railroad, Chicago, Ill. C. H. Williamson, Telegraph and Telephone Engineer, St. Louis and San Francisco Railway, Springfield, Mo. H. W. Drake (Consulting Member), Apparatus Engineer, The Western Union Telegraph Company, 195 Broadway, New York.

COMMITTEE No. 3—PROTECTION AGAINST ELECTROLYSIS

A. Y. Tomlinson (Chairman), Division Operator, Eastern Region, Pennsylvania Railroad System, Jersey City, N. J. L. D. Shearer (Vice-Chairman), Superintendent Telegraph, Reading Company, 607 Baer Building, Reading, Pa. W. M. Craft, Department of Operation and Engineering, American Telephone and Telegraph Company, 195 Broadway, New York. G. O. Perkins, Superintendent Telegraph and Signals, Chicago Great Western Railroad, 303 West Harrison Street, Chicago, Ill. P. J. Howe (Consulting Member), Construction Engineer, The Western Union Telegraph Company, 195 Broadway, New York.

COMMITTEE No. 4—ELECTRICAL PROTECTION

J. F. Caskey (Chairman), Superintendent of Telegraph, Lehigh Valley Railroad, Bethlehem, Pa. L. Behner (Vice-Chairman), Assistant Superintendent Telegraph and Signals, Central Region, Pennsylvania Railroad System, Pittsburgh, Pa. W. L. Cook, President, Reliable Electric Company, 3145 Carroll Avenue, Chicago, Ill. W. M. Gould, American Telephone and Telegraph Company, 195 Broadway, New York. G. H. Mayer, Superintendent of Telegraph, Minneapolis, St. Paul & Sault Ste. Marie Railway, Chicago, Ill. P. Norton, Western Electric Company, Inc., 463 West Street, New York. P. A. Rainey, Electrical Engineer, Telegraph Department, Eastern Region, Pennsylvania Railroad System, Philadelphia, Pa. H. W. Drake (Consulting Member) Apparatus Engineer, The Western Union Telegraph Company, 195 Broadway, New York.

COMMITTEE No. 5—COMMUNICATION DEVELOPMENT

J. A. Jones (Chairman), General Superintendent Telegraph, Southern Railway System, Washington, D. C. S. L. Van Akin, Jr. (Vice-Chairman), Assistant Superintendent Telegraph, New York Central Railroad, Buffalo and East, 50th Street and Lexington Avenue, New York. L. W. Chubb, Managing Radio Engineering Department, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. A. L. Budlong, American Radio Relay League, 1045 Main Street, Hartford, Conn. B. A. Kaiser, Special Representative, American Telephone and Telegraph Company, 195 Broadway, New York. W. M. Post, Superintendent Telegraph and Signals, Central Region, Pennsylvania Railroad System, Pittsburgh, Pa.

COMMITTEE No. 6—MESSAGE TRAFFIC

H. C. Chace (Chairman), Superintendent of Telegraph, Atchison, Topeka & Santa Fe Railway, Topeka, Kans. P. F. Frenzer (Vice-Chairman), Superintendent of Telegraph, Union Pacific Railroad, Omaha, Nebr. F. E. Bentley, Superintendent of Telegraph, Terminal Railroad Association of St. Louis, St. Louis, Mo. J. H. Brennan, Superintendent Telegraph, St. Louis-San Francisco Railway,, Springfield, Mo. C. H. Gaffeney, Superintendent Telegraph, Central Railroad of New Jersey, Jersey City, N. J.

A. P. Linnell, Superintendent of Railway Service, Canadian National Railways, Montreal, Que. J.

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Matthews, Telegraph Manager, Gulf, Colorado & Santa Fe Railway, Galveston, Texas. W. D. Neil, Assistant Manager of Telegraphs, Canadian Pacific Railway, Winnipeg, Man. E. M. Pence, Division Operator, Southwestern Region, Pennsylvania Railroad System, Cincinnati, Ohio. M. O. Scobee, Superintendent of Telegraph, El Paso & Southwestern System, El Paso, Texas.

COMMITTEE No. 7—INDUCTIVE INTERFERENCE

L. Behner (Chairman), Assistant Superintendent Telegraph and Signals, Central Region, Pennsylvania Railroad System, Pittsburgh, Pa. W. A. Jackson (Vice-Chairman), Assistant Superintendent Telegraph, Michigan Central Railroad, Detroit, Mich. A. H. Armstrong, Chairman, Electrification Committee, General Electric Company, Schenectady, N. Y. R. D. Evans, General Engineer, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. M. R. Greenamyer, Inspector, Telegraph Department, Pennsylvania Railroad System, Philadelphia, Pa. G. W. Jett, Superintendent Telegraph, Norfolk and Western Railway, Roanoke, Va.

G. W. Shoester, Division Operator, Eastern Region, Pennsylvania Railroad System, Trenton, N. J. A. Thompson, General Foreman, Southern Pacific Company, San Francisco, Cal. H. M. Trueblood, Engineering Department, American Telephone and Telegraph Company, 195 Broadway, New York. J. W. Milnor (Consulting Member), Research Engineer, The Western Union Telegraph Company, 195 Broadway, New York.

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W. A. Fairbanks (Chairman), Secretary, Telegraph and Telephone Section, 30 Vesey Street, New York. J. F. Caskey, Superintendent of Telegraph, Lehigh Valley Railroad, Bethlehem, Pa. L. S. Wells, Electrical Superintendent and Superintendent Telegraph, Long Island Railroad, Pennsylvania Station, New York.

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J. A. Jones, General Superintendent Telegraph and Telephone, Southern Railway System, Washington, D. C. H. C. Chace, Superintendent of Telegraph, Atchison, Topeka & Santa Fe Railway, Topeka, Kans. L. Behner, Assistant Superintendent Telegraph and Signals, Central Region, Pennsylvania Railroad System, Pittsburgh, Pa. W. A. Fairbanks, Secretary, Telegraph and Telephone Section, 30 Vesey Street, New York. P. F. Frenzer, Superintendent of Telegraph, Union Pacific Railroad, Omaha, Nebr. I. C. Forshee, Telegraph and Telephone Engineer, Pennsylvania Railroad System, Philadelphia, Pa. J. D. Jones, Superintendent Telegraph and Signals, Eastern Region, Pennsylvania Railroad System, Philadelphia, Pa.

This Committee consists of the Chairmen of all Standing Committees. The First Vice-Chairman of the Section is Chairman.

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P. F. Frenzer (Chairman) Superintendent of Telegraph, Union Pacific Railroad, Omaha, Nebr. L. S. Blackman (Vice-Chairman) Telegraph and Telephone Inspector, Chicago, Rock Island & Pacific Railway, Davenport, Iowa. A. W. Flanagan, Superintendent of Telegraph, Southern Pacific Company, San Francisco, Cal. W. Marshall, Assistant Manager of Telegraphs, Canadian Pacific Railway, Winnipeg, Man. G. W. Shoester, Division Operator, Eastern Region, Pennsylvania Railroad System, Trenton, N. J. L. S. Crosby, Supervisor of Instructions, American Telephone and Telegraph Company, 195 Broadway, New York. H. B. McChesney (Consulting Member) General Supervisor, Traffic Department, The Western Union Telegraph Company, 195 Broadway, New York.

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I. C. Forshee (Chairman) Telegraph and Telephone Engineer, Pennsylvania Railroad System, Philadelphia, Pa. C. E. Baxter (Vice-Chairman) Telegraph and Telephone Engineer, Michigan Central Railroad, Detroit, Mich. E. V. Adams, Railroad Sales Engineer, Western Electric Company, Inc., 100 East 42d Street. New York. C. D. Briggs, Telegraph and Telephone Engineer, New York, New Haven and Hartford Railroad, New Haven, Conn. W. H. Capen, Engineer, Department, International Western Electric Company, Inc., 463 West Street, New York.

J. H. Ditch, Supervisor, Telephone Lines, Eastern Region, Pennsylvania Railroad System, Philadelphia, Pa. S. L. Elliot, Inspector of Telegraphs, Canadian Pacific Railway, Montreal, Que. F. S. Foland, Long Lines Engineering Department, American Telephone and Telegraph Company, 195 Broadway, New York. B. F. Thompson, Telephone Engineer, Baltimore & Ohio Railroad, Baltimore, Md. H. W. Drake (Consulting Member) Apparatus Engineer, The Western Union Telegraph Company, 195 Broadway, New York.

COMMITTEE No. 12—RADIO AND WIRE CARRIER SYSTEMS

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. Aspinwall, Railway Equipment Engineer, Westghouse Electric and Manufacturing Company, East ttsburgh, Pa. A. L. Dudlong, American Radio elay League, 1045 Main Street, Hartford, Conn. J. Graf, Telephone Engineer, Delaware, Lackaanna & Western Railroad, Scranton, Pa.
R. R. Hobbs, Superintendent Telegraph, Louisle & Nashville Railroad, Louisville, Ky. R. H. G. athews, Chief Radio Engineer, Chicago Radio aboratory, 332 South Michigan Avenue, Chicago, . Elam Miller, American Telephone and Telegraph Company, 195 Broadway, New York. D. arnoff, Vice-President and General Manager, adio Corporation of America, 233 Broadway, New ork. G. T. Stanton, Telegraph and Telephone ngineer, Cleveland, Cincinnati, Chicago & St. ouis Railway, Indianapolis, Ind. W. H. Swift, Jr., adio Engineer, Canadian National Railways, Monreal, Que.

COMMITTEE No. 13—ARRANGEMENTS

J. A. Jones (Chairman) General Superintendent elegraph, Southern Railway System, Washington, . C. E. V. Adams, Railroad Sales Engineer, Vestern Electric Company, Inc., 100 East 42nd treet, New York. B. A. Kaiser, Special Representative, American Telephone and Telegraph Company, 195 Broadway, New York.

vacancies

SPECIAL COMMITTEE ON RULES AND ORGANIZATION

J. F. Caskey (Chairman) Superintendent Telegraph, Lehigh Valley Railroad, Bethlehem, Pa. J. H. Brennan, Superintendent Telegraph, St. Louis-San Francisco Railway, Springfield, Mo. E. E. Dildine, Superintendent of Telegraph, Northern Pacific Railway, St. Paul, Minn. R. F. Finley, Superintendent Telegraph, New York Central Railroad, Cleveland, Ohio. I. C. Forshee, Telegraph and Telephone Engineer, Pennsylvania Railroad System, Philadelphia, Pa. J. C. Johnson, General Superintendent of Telegraph, Pennsylvania Railroad System, Philadelphia, Pa. W. H. Hall, General Superintendent Telegraph, Missouri-Kansas-Texas Lines, Denison, Texas. G. D. Hood, Superintendent of Telegraph, Chicago, Rock Island & Pacific Railway, Chicago, Ill. E. C. Keenan, General Superintendent of Telegraph and Telephone, New York Central Lines, 466 Lexington Avenue, New York. H. A. Shepard, General Superintendent Electric Transmission and Communication, New York, New Haven & Hartford Railroad, New Haven, Conn.

SPECIAL COMMITTEE ON REVISION OF RULES FOR COMMITTEE WORK

M. R. Greenamyer (Chairman) Inspector, Telegraph and Telephone Department, Pennsylvania Railroad System, Philadelphia, Pa. R. F. Finley, Superintendent of Telegraph, New York Central Railroad, Cleveland, O. L. F. Shea, Superintendent of Communication, New York, New Haven & Hartford Railroad, New Haven, Conn.

C. A. RICHARDSON, superintendent, Postal Telegraph-Cable Company, Albany, N. Y., in renewing his subscription for another year writes: "Yours is about the only bill that I cheerfully settle."

Telegraph and Telephone Life Insurance Association

ASSESSMENT Nos. 846, 847, 848 and 849 have been levied by the Telegraph and Telephone Life Insurance Association, New York, to meet the claims arising from the deaths of Howard J. Brown, aged sixty-eight years, Pittsburgh, Pa.; Gilbert V. Seward, aged seventy-four, Chicago; Gustavus A. Stimpson, aged seventy-nine, Brooklyn, N. Y.; Henry J. Stevens, aged seventy-four, Salem, Va.; Frank C. Mason, aged seventy, Sparta, Mich., and Wellington C. Bowers, aged seventy-one, Hamburg, Pa.

THE Proceedings of the Fifty-seventh Annual Meeting of the Telegraph and Telephone Life Insurance Association, held March 12th, has been released by the Vice-President, Thomas E. Fleming, and scattered among the membership at large. It is a twenty-two page booklet, without counting the cover. It gives the minutes of the meeting held on March 12th. It enumerates the report of all the officers; First-Division Full-Grade Membership; duration of membership of deceased members in full grade; duration of membership of deceased members in half grade; duration of membership resigned and lapsed in full grade; second division; third division; financial, First Division—assessments; Second Division—assessements; Third Division—dues and fees; summary of securities owned by First Division as of December 31, 1923, second division, third division; Bonds owned by third division as of December 31st, 1923; condensed financial statement; statement of expenses for years ended December 31st, 1922 and 1923; third division bonds purchased; report of the Auditing Committee; statement of reserve fund deposit account since last report; expense account; Amendments to By-Laws and the collectors.

Radio Phone Receiving

Radio Phone Receiving is the title of a book that was placed on the market on May 1. It is a practical work for everybody and was written by nine specialists. It contains 224 pages, fully illustrated. The book measures 7½ inches long by 5 inches wide. The price is $1.50 per copy.

The authors include Michael I. Pupin, Alfred N. Goldsmith, Erich Hausmann, Frank E. Canavaciol, John H. Morecroft, Robert D. Gibson, Louis A. Hazeltine and John V. L. Hogan.

The very questions frequently asked by the radio operator are answered in this book. Explanations and solutions of the difficulties encountered by the radio enthusiast are treated in a clear and comprehensive manner. The book fills a long-felt want. It is just what you have wished for! It will teach you how to receive messages of any wave-length to perfection. It will help you to solve your troubles and save you money in the proper selection of the apparatus required. The last word in telephone receiving, beautiful photos and simple diagrams accompany the text. Regardless of what other books on radio you own—this is the book you must have. Address and make remittances to TELEGRAPH AND TELEPHONE AGE, 253 Broadway, New York.

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POSTAL TELEGRAPH-CABLE COMPANY

J. P. O'DONOHUE, assistant chief engineer, has been appointed traffic enigneer in direct charge of traffic throughout the System.

T. N. Powers, acting traffic manager, has been appointed assistant traffic engineer.

Effective January 1st, 1925, J. J. Lynch, at present superintendent of construction, Pacific Division, becomes general superintendent of plant, with headquarters at New York, and will be in charge of all outside plant construction and maintenance.

New York City

E. FINELLI, wire chief, was transferred recently from the early night force to a day tour on the Southern board.

Tillie Schatz, formerly an operator in the broker division, was married on November 12th to Irving Kerwot. After the ceremony the couple went to Atlantic City on their honeymoon.

James McCullough, a new arrival on the check force, may some day be a man of letters. His first effort was a prize of $20.00, offered by a local paper for the best reason why he secured the position through its columns.

What is a magnet? What are consequent poles? These, and others, are heard around the operating room since the electrical class formed by the day wire and quadruplex chiefs, and multiplex attendants started a few weeks ago. Printer Chief O'Keefe the instructor, must have stirred up something, because every time a chief has a few minutes' idle time, out comes Swoope's "Lessons in Practical Electricity," and a thoughtful expression settles upon the reader's face. It was hinted that this was just a burst of enthusiasm quickly to die, but O'Keefe points out that thirty students have stuck it out. The class for night workers has also started under the instruction of Mr. Motto of the Multiplex Department. There is a suspicion that the night force intends to show up the day boys. The day force, however, are confident that they will come through with flying colors.

Multiplex Attendant Otto Adamec, has been transferred from the late night tour to a day trick, and Burns to the all-night tour.

H. F. RUSSELL, manager of the Commercial Cable Company, London, England, is on the continent in connection with work on the new German-New York cable.

Telephone at Grand Canyon

ONE of the arguments advanced in favor of the the United States to become accessible by telephone is the El Tovar Hotel on the rim of the Grand Canyon. Telephone connection with the outside world has now been completed by a 240-mile wire to Phoenix, Arizona. The wire connects with the new trans-continental line between Chicago and Los Angeles, which is the longest through telephone circuit in the world.

WESTERN UNION TELEGRAPH COMPANY

NEWCOMB CARLTON, president, was in Halifax last week looking over the company's property and inspecting the new cable ship "Cyrus Field."

J. C. Willever, vice-president in charge of commercial, returned from Europe on December 10th on the steamer "Aquitania."

J. J. Welch, vice-president in charge of traffic, is on a trip that will include all the divisions. He will be absent from his office until January 20th.

Philo Holcomb, general inspector in the office of vice-president in charge of traffic, who has been on sick leave, has recovered and is now making an inspection of offices in Florida.

C. S. Sousa has been appointed manager of the Quincy, Mass., office, which includes twelve of the outlying districts.

Borough Business Is Healthy

By CHARLES B. MCCANN

District Commercial Superintendent, Western Union Telegraph Company

JUDGING business conditions from the state of the telegraph business in the district which I am responsible for—Brooklyn, Richmond and Long Island—I should say that they are very satisfactory.

In Brooklyn business has a healthy tone. The deliveries of commercial telegrams have increased, which means that business has progressed in the same way.

In the past business was somewhat restricted, with the retailers going along without properly stocking up their shops. They, then, led a rather hand-to-mouth existence because of the existing business uncertainty.

But now things are different. We, in the telegraph business, can sense and see the change. There is a large demand for telegraph service, because the merchants and manufacturers have found a large demand for their products.

I find that business men use the telegraph for distances over 50 to 100 miles. At the short distances the telephone is perhaps more direct and personal, and the service is cheaper. But when it is desired to get quick action at great distances nothing discovered at the present time can meet the commercial requirements as does the telegraph.

Commercial use of our wires resolves itself primarily into the making of business offers, the placing of orders and the final negotiating of the business transactions. Business men choose the telegraph over the mails because of its speed. A whole transaction can sometimes be completed before a letter would hardly be started on its necessarily slow journey.

In the same way that the telegraph is a barometer of business conditions in this country, so do the cables serve to feel the pulse, so to speak, of the foreign business in which our commercial men are interested.

Recently the cables have been used consistently. There was a time when the trans-Atlantic cables

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were practically idle—that was during the war. The increased number of business messages flashing under the seas indicate but one thing, the expansion of our foreign export and import trade.

In Brooklyn the Western Union Telegraph Company has recently established three new branch offices—at 14th Avenue and 36th Street, at Kings Highway and East 37th Street and at 12th Street, Coney Island. These are all in residential sections of the borough. They were organized to give the increasing number of home owners better service, by quicker deliveries.

People use day and night letters because they are fresher than are letters. This is an age when every one wants to get the latest news and is not content with a narration of facts which have been changed by something that has come up in the meantime.

The radio, I believe, has done this, and the daily newspapers, with their numerous editions, have whetted the public's appetite for instantaneous news.

Such obstacles help to slow up the service, as the people who mean to send a telegram to Washington Place oftentimes forget whether it was Washington Place, Park or Street, and invariably, in such a case, send it to the Street.

But those are just incidentals. In the large, the telegraph is going hand in hand with business. We are all very much on the up-grade of live stock and live stock products. The figures serve to show that the economic position of the farmer has been materially improved by the results of this year's crops.

The farmer in the United States has been fortunate in the fact that while countries outside are running short crops, the American crop has been as large as any since 1919. The wheat farmer in this country is apparently taking advantage of the high prices prevailing. Wheat marketings since July 1 have been approximately 64 per cent higher than in 1923. Wheat exports also are running extremely heavy, the rate to date being about 40 per cent higher than in the same period of last year.

The rapid rate of marketing and high prices give assurance that at present the wheat farmer is in a decidedly better cash position than he was a year ago. The world situation would indicate that current high prices will probably last throughout the crop year, and that the wheat farmer's present strong position will not tend to weaken as the crop year advances.

Radio Corporation of America

GENERAL JAMES G. HARBORD, president, in company with Mrs. Harbord and Vanness Phillip, export manager of the Corporation, left New York on December 9th on a three months' business trip to Cuba and South America. The party will attend the dedication of the Roosevelt Memorial on the battlefield at San Juan, Cuba on December 14th. General Harbord will make the principal address.

President Coolidge has designated General Harbord as his official representative at the ceremony.

General Harbord was stationed in the City of San Diego as a lieutenant of cavalry in 1900.

From San Diego, Cuba, the next stops will be made at Kingston, Jamaica, Cristobal, Panama, Panama City and Balboa, arriving at Valparaiso, on January 14th. Nearly a month will be spent at San Diego, Chile, Buenos Aires, Montevideo, Santos and Sao Paulo. Returning, the party will sail from Rio de Janiero on February 8th, arriving in New York about February 25th.

E. J. Nally, managing director of foreign relations, accompanied by Mrs. Nally and A. L. Brush of the Paris office, sailed from New York on the steamship Majestic on November 29th. The party is returning to France after a ten weeks' visit in the United States on Mr. Nally's vacation.

Recent visitors in New York for the purpose of attending a series of conferences between representatives of foreign telegraph administrations have been Dr. and Mrs. Karl Shapira and H. Abrahams of Berlin, Germany. Dr. Shapira is the director and Mr. Abrahams the engineer of the Telefunken Company. They sailed for home on December 6th.

OBITUARY

CAPTAIN TIMOTHY DOHERTY, for thirty-five years manager of the North American Telegraph Company at St. Paul, Minn., died in that city on November 21st.

His death, at the age of 82 years, was due to heart failure, caused by pneumonia, during an illness of less than two days.

Captain Doherty had an eventful career. Born in Ireland in 1842, he came to this country in his fourteenth year.

At the age of 19 years, while living in Connersville, Ind., he enlisted in the 16th Indiana Volunteer Infantry, and served with distinction all through the war, being twice wounded, once quite seriously.

His promotion to a captaincy was made in 1862.

At the close of the conflict he served as provost marshal at New Orleans, under the Ben Butler regime, until honorably discharged, when he engaged in the cotton brokerage business in that city, in which he was very successful up to the time of the Jay Cooke panic, when the failure of a bank wiped out a comfortable fortune.

Arriving in Minneapolis in 1881, he secured a position as bookkeeper with the Western Union Telegraph Company, remaining with that company until the advent of The North American Telegraph Company, in 1886, when he was appointed manager of its St. Paul office, in which capacity, through his personality and tact, he built up a fine business for the company.

The "Captain," as he was familiarly called by thousands of friends and long-time acquaintances, was a striking and most engaging personality. He looked every inch the soldier and always had a deep interest in all affairs of the survivors of the Civil War.

A member of the Minnesota Commandery of the Military Order of the Loyal Legion, and for a term its commander, his presence at meetings was a tonic to many of the old boys.

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It was his custom, up to a few years ago, to attend the yearly reunions of his old company at Connersville, an event that gave him great pleasure. At the time of his death he was the sole survivor of his command.

To his intimate associates, Captain Doherty was a jovial companion, a man of wide reading and general knowledge, a genial philosopher and a most sincere and everlasting friend.

He was buried on November 25th, at Arlington Cemetery, Washington, with military honors, by a detachment of infantry from Fort Meyer.

CHARLES W. MONTGOMERY, a veteran of the Confederate service during the Civil War, died at Natchez, Miss., where he was manager of the Western Union Telegraph Company. In his younger days Mr. Montgomery was an expert operator and many of the old timers now living, particularly those in the South, will, no doubt, remember having worked with him after the Civil War.

FRANK C. MASON, aged seventy years, died at Sparta, Mich., on October 14th. Mr. Mason was, for twenty years, superintendent of the Fire Department Telegraphs of Brooklyn, N. Y.

J. F. Hahn, aged eighty-three years, of Washington, D. C., died in Indianapolis, Ind., on November 5th.

FARRELL J. SHERIDAN, recording secretary of the New York Telegraphers' Aid Society, died on December 3rd. Funeral services were held on December 6th at his home in Brooklyn, N. Y.

—o—

A FRIEND in Cleveland, who is a well-known electrical engineer, writes and inquires:

"Did you get Europe on a one-tube set? All the liars around here did."

Our answer to this is: "No.

"*The Age* doesn't get Europe, except by mail or cable or R. C. A."

If *we* wanted to hear the foreign broad-casters we would install one of those neuterodynes that Bunnell's are advertising on page IV of this issue —then there would be no need for us to strain veracity in bragging about the DX results that we would get. And we respectfully advise our Cleveland friend to do the same thing.

If any of our readers have heard any remarkably distant radio stations we will welcome their letters telling us about them; but we do not undertake to vouch for anything that the Cleveland man in question may tell us, unless, and until, he installs a Bunnell neuterodyne or something else equally efficient and reliable.

Major Cecil W. Mackenzie

MAJOR CECIL W. MACKENZIE of Buffalo and Fort Erie, Ont., has given an unusually good account of the recent meeting of the Telephone Pioneers at Chicago, and he stopped over en route to the "Telephone City," Brantford, Ont., and visited the former home of Alexander Graham Bell on Tutela Heights and the other interesting points of interest.

The Major has gathered a large amount of valuable data concerning the invention, etc., of the telephone in that vicinity and many letters from prominent telephone officials have been received concerning that part of his trip.

He already has his grip packed for the Boston meeting next year.

—o—

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Delicate Adjustments in Long Distance Circuits Make Possible Simultaneous Radio Broadcasting

By JOHN B. O'BRIEN

DISTANCE no longer is any bar to communication between individual and individual in the United States. Boston talks to San Francisco with almost the same facility as to a neighbor on the next street. Millions of conversations take place each day over the nation's highways of speech——the Long Lines of the Bell System.

Another use of the Long Distance Lines, however, now makes it possible for one man to talk simultaneously to millions in any part of the country. The energy of the average human voice in ordinary conversation is so feeble that if, for example, all the people of New York City should speak at once, the power would be only sufficient to light a small incandescent lamp. However, the voice can be carried by wire to powerful radio stations hundreds and even thousands of miles away, where it is amplified thousands of times and then broadcast.

National radio broadcasting is accomplished through the use of land wires, the Long Lines of the American Telephone and Telegraph Company. A favorably located broadcasting station is sufficient when the desire is simply to reach a comparatively local audience within the radius of a few hundred miles, but if a large section of the country is to be covered, then it becomes necessary to connect a number of broadcasting stations by wire. The wire lines efficiently transfer the speech or music for large distances overland, while the broadcasting stations send the program to the various listeners in their local area.

In order to give the listener the most complete picture possible of just what is taking place when an event of more than ordinary importance is being broadcast, so that he may hear not only the speaker, but in addition the cheering of the galleries, the music and rapping of the chairman's gavel, and the incidental sounds and noises which complete the impression and allow him, as it were, to take an actual part in the gathering, a number of microphones are placed in different parts of the auditorium or banquet hall. There is one on the speaker's desk, another where the band or orchestra is playing, and sometimes a third placed in the auditorium or in the galleries.

Telephone circuits that are satisfactory for commercial service are not nesessarily suitable for broadcasting service. For good telephone service, ease of understanding speech is required; but for countrywide broadcasting, it is necessary that all the variation in pitch and volume and quality of elaborate music be transmitted without appreciable change.

These transmission requirements for broadcasting depend on the type of material which it is desired to transmit. For example, the results of a football game or political speech do not offer very serious problems, but for the music of a symphony orchestra the requirements are extremely severe, with the result that special and usually very expensive circuit arrangements are required.

In adapting circuits to radio broadcasting which are ordinarily used for Long Distance telephony special alterations must be made. In ordinary Long Distance communication, speech to be understood requires the line to be adapted to faithful transmission of a band of frequencies of about 2,000 cycles. One pair of wires can be used for as many as four different conversations in addition to four telegraph messages. In radio broadcasting, however, it is necessary to consider not only the range of frequencies—often 5,000 or more —which can be transmitted without appreciable distortion, but also the range of volume to insure against interference from noise. When transmitting very high class music over the wires the services usually carried over those wires must be re-routed over other circuits. Special equipment to insure accuracy must also be installed and adjusted and numerous tests made. To care for emergencies two pairs of wires are usually provided.

To raise the volume level when necessary because of the long distance over which the voice currents must travel, repeaters or amplifiers are installed at various points along the line. At the broadcasting end the output of the line is also amplified thousands of times before it is finally radiated into the ether by the radio station.

Station WEAF was officially opened on July 25, 1922, but it was not until January 4, 1923, that the first simultaneous broadcasting of two stations connected by wire lines took place—WEAF New York and WNAC Boston. When President Harding made his last trip to the Pacific Coast, in June of 1923, his addresses in St. Louis and Kansas City were broadcast through KSD St. Louis, WDAF Kansas City and WEAF New York. At about the same time WMAF South Dartmouth, Mass., began a daily program furnished over the wire lines from New York and when WCAP Washington, D. C., was opened on July 4, 1923, the program was furnished by wire from New York.

Four radio stations were linked by land wires for the first time in June, 1923, when the Public Policy Meeting of the National Electric Light Association at Carnegie Hall, New York, was broadcast. October, 1923, witnessed the inauguration of the service between WJAR Providence and WEAF. The first World Series game to be broadcast was that of October 14, 1923, when four radio broadcasting stations were linked together.

President Coolidge's first message to Congress on December 6, 1923, attracted wide attention, not only because the nation was eager to learn the views and recommendations of the new President, but also because six broadcasting stations transmitted the message simultaneously over 3,600 miles of telephone lines.

On the night of February 8, 1924, a memorable demonstration was given of international transcontinental wire telephony. It was conducted by General John J. Carty, vice-president of the American

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Telephone and Telegraph Company, who called the roll of 21 cities connected to the transcontinental line extending from Havana to San Francisco. There were also connected seven radio stations all the way from Havana, Cuba, to KLX Oakland and KPO San Francisco. This was the first time that so many radio stations had been linked simultaneously with the Transcontinental circuit.

The next important event in nationwide broadcasting was the address of President Coolidge on April 22, 1924, at the Associated Press luncheon in New York. On that occasion eleven broadcasting stations were linked together by the Long Lines of the Bell System.

During the 1924 political campaign national radio broadcasting with the aid of the telephone lines, played an important part. Beginning with the events at both the Republican and Democratic National Conventions, the most important addresses were broadcast through the leading radio stations of the country which were linked together by wire. In the celebration of Defense Day, under the auspices of the Army authorities, eighteen broadcasting stations were connected with 19,000 miles of telephone wire and two-way conversations were held between General Pershing and the commanding generals of the various corps areas. On election eve twenty-seven broadcasting stations, including six on the Pacific coast, were connected by wire to broadcast the address of President Coolidge and a substantial part of the same hook-up for the speech of John W. Davis.

The great advantage of the use of a wire system for distribution of radio programs lies in the fact that extraneous disturbances are largely eliminated, that there is no static to cause any trouble and no interference from other messages, and that the volume of intensity can be regulated with exact precision.

Test All Long Distance Lines Every Morning

EARLY every morning before most people are ready to give serious thoughts to the problems of the day, a test is made of the main groups of the Long Lines of the American Telephone and Telegraph Company, all the way from Boston to San Francisco, from Duluth to Key West. Each of the twenty-three district offices makes a test of the Long Distance lines within its territory. The test begins between 5 and 6 o'clock in the morning when the lines are least busy.

The object of this early morning test of the nation's highways of speech is to determine the condition of the wires and to find out if the plant is ready for the day's job. When the general plant manager at headquarters in New York City arrives at 9 o'clock, he is at once informed of the condition of the Long Lines wires all over the country.

If the operators on trying out the lines find any trouble, they refer the matter to the toll wire testers, who, like magicians, sit at their offices, probe into the wires with their delicate instruments and tell within a few feet where a wire is tangled or broken. They become so expert that their ears often suffice and by merely listening in on a wire they can estimate the location of the trouble.

Because of the early morning test, the toll operator can accept a Long Distance call with confidence that she will be able to offer a clear circuit to a distant city, and the operator at the other end knows she will be able to complete the call successfully if the person desired is anywhere near a telephone in her territory.

Facts About the Telephone

ILLINOIS has more telephones than the whole of Great Britain.

Among the forty-eight states that make up the United States of America, there are five each of which has more telephones than the entire continent of Asia

Telephone companies in the United States employ 190,000 telephone operators. In addition, thousands of telephone operators are employed by large business houses, banks and hotels.

There is now one telephone for every seven people in the United States. Ten years ago there was one telephone for every 10 people; and in 1900 there was only one telephone for every 57 people in this country.

The first telephone exchange in Detroit, Mich., was established August 15, 1878. In the 46 years since then the Detroit system has grown to more than 190,000 telephones. In fact, there are more telephones in Detroit than in all of Belgium, Greece, Roumania, Portugal and Bulgaria combined.

The number of telephone conversations that take place annually in the United States averages over 174 for every man, woman and child in the country. Germany has fewer than 36 telephone talks annually per inhabitant, and France and Great Britain have less than 18.

What "Station" Means in Telephone Parlance

IN telephone parlance every telephone instrument is a station, so that when the statement is made that there are now 15,600,000 telephone stations in the Bell System, it means that there are that many telephone instruments in actual use in the United States, Bell-owned or connected with the System.

Telephone subscribers, however, are sometimes confused by the terms station-to-station in placing long distance telephone calls. An amusing instance of this is cited recently from Des Moines. A party in that city called the rate clerk and requested the rate to Parker's Prairie, Minnesota. After being told that the station-to-station rate was $2.15 for three minutes the subscriber said, "Thank you" and hung up. Five minutes later the same person called the rate clerk again and wanted to know how many stations there were between Des Moines and Parker's Prairie. He was trying to figure how much the call would cost him.

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